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Aslib Proceedings

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13

The Dissemination of Published Information to the Executives of a Major Steel Group

R. HINDSON

ASLIB · 3 BELGRAVE SQUARE · LONDON SW1

The opposite of a frozen swimming poo

Only one thing thwarts the Gaffer (Sir Basil Blackwell). When h swimming pool freezes over he can't take his usual morning dip. Ar he can't do anything about it.

Blackwell's is the opposite. He can always do something about i

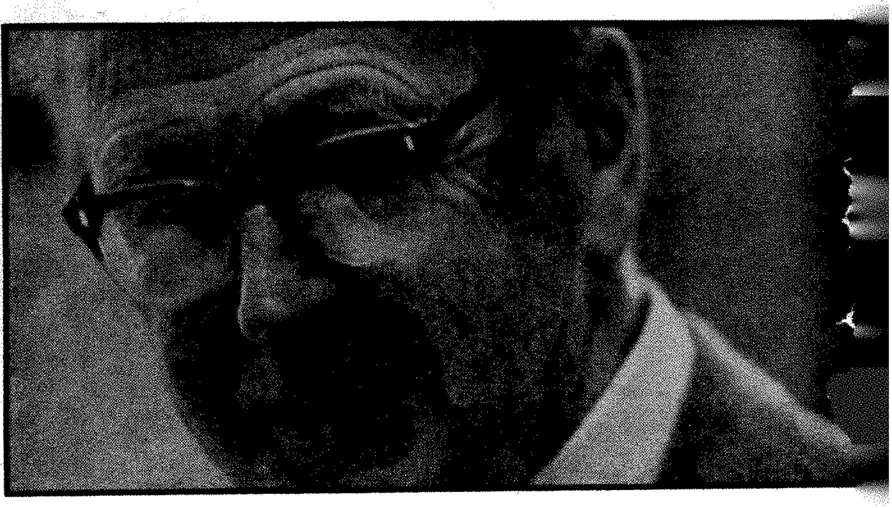
He's been doing it now for fifty-one years. He's been making bigger, busier, livelier. And probably the last is what he minds abou most.

He may be old-fashioned about some things. Like expecting letters t arrive on time—and giving the GPO hell when they don't. Like gettir to work at 7 a.m. on Saturdays. But in other ways he's as new-fashion as a KWIC index or a Cranfield research project.

You have to be mechanised. He's all for that. But he insists t modern people are more important than modern machines. He likes hire people who are sparking with new ideas, new enthusiasms. He like to see them throwing old, cumbrous systems out of the window . . finding short cuts . . . breaking unnecessary rules. And he likes them be friendly. People who are helpful and understanding—not because it their job but because it's their nature.

He has a lot to answer for. The Gaffer. He has made Blackwell's pre much the way it is.

(Maybe that's why he always answers the rudest letters himself.)



Don't let the Gaffer see this whatever you do. *J. B.*

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CALCUTTA UNIVERSITY CENTRAL LIBRARY

ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 17 January 1965 Number 1

ASLIB CALENDAR 1965

January

TUE.26. Evening meeting at Aslib, 5 for 5.30 p.m. 'A new university prospect.'

February

TUE.2 – WED.3. Course on work with patents.

TUE.9. Midlands Branch meeting, Arden Hotel, Birmingham, 6.30 p.m. 'The Cranfield project', by Jack Mills.

MON.22 – TUE.23. 'Getting help from others', a course on co-operation in library and information work. See paragraph below.

THUR.25. Evening meeting at Aslib, 5 for 5.30 p.m. Paper by Timothy Raison, Editor of *New Society*. See paragraph below.

March

WED.3. Film Libraries Group, Shell Centre, 6.30 for 6.45 p.m.

THUR.4. Technical Translation Group meeting at Aslib, 3.30 p.m.

WED.17. Evening meeting at Aslib, 5 for 5.30 p.m. Panel session.

FRI.19. Scottish Branch one-day conference, Edinburgh.

TUE.23. Midlands Branch annual general meeting, Engineering Centre, Birmingham, 6.15 p.m.

TUE.23 – FRI.26. Junior introductory course to special library and information work.

April

THUR.1 – SAT.3. Aeronautical Group and Technical Translation Group joint conference at Cranfield. See paragraph below.

WED.7. Film Libraries Group annual general meeting and film at Shell Centre, 6.30 for 6.45 p.m.

THUR.29 – FRI.30. Northern Branch conference at Ilkley.

THUR.30 – SUN.2 May. Midlands Branch conference, Belle Vue Hotel, Cheltenham. 'Practices and opinions on inter-library lending and co-operation', by K. W. Atkin, D. W. Bromley, K. V. Aubrey, G. H. Wright.

May

THUR.6. Technical Translation Group meeting at Aslib, 3.30 p.m. 'The linguistic aspects of philately', by I. F. Finlay.

WED.12. Electronics Group visit to IBM, Winchester.

MON.24 – FRI.28. Course on abstracting and co-ordinate indexing.

SAT.29 – SUN.30. Engineering Group annual week-end conference, Leamington Spa.

July

FRI.9 – SUN.11. Electronics Group 7th conference, Ashridge.

New Year Honours

Congratulations are extended to those persons associated with Aslib whose names appeared in the New Year Honours List. Conspicuous among them are Mr W. Pearson, Librarian of the Ministry of Housing and Local Government, who received the M.B.E., and Mr C. F. Fryer of DSIR, who is concerned with Aslib's grant accounting and who received the O.B.E. The O.B.E. was also awarded to Mr P. E. Jones, Deputy Keeper of Records at Guildhall Library, London, and the C.B.E. to Dr D. W. Hill, Director of Research of the Cotton, Silk and Man-Made Fibres Research Association.

Among those to receive the O.B.E. was Mr A. C. Townsend, Librarian of the British Museum (Natural History) who, among other things, played a notable part in the establishment of the Aslib Biological Group. Members will, however, have learned with deep regret of the tragic death of Mr Townsend in an accident only a few hours before the Honours List was published. By his death, the world of librarianship has lost a renowned scholar and a delightful colleague.

Problems of an Editor

On Thursday 25th February Mr Timothy Raison, Editor of *New Society*, will be the speaker at an Aslib evening meeting. Mr C. W. Hanson, Head of the Aslib Research Department, will take the chair. The meeting will be held at 3 Belgrave Square at 5.30 p.m. and tea will be served at 5 p.m.

The editor of a weekly has to combine a number of different roles—all of which are part of his job as an editor but nearly all of which can be a distraction from the principal task. Mr Raison will describe how he faces these problems in editing *New Society*.

'Getting Help from Others'

Co-operation with other organizations is an essential element in any special library or information service. A special library, with its restricted stock and the constantly changing needs of its readers, is bound to depend heavily on other libraries to help supply readers' needs. An information service, which operates as a channel for the flow of ideas, could not exist without co-operation with others. A whole complex of organizations exists to further co-operation in library and information work, but individual librarians and information officers do not always make the best use of it, either because they are not sufficiently familiar with all the sources that exist, or else because they do not go about obtaining help in the most profitable way. To meet the needs of such people a course entitled 'Getting help from others' will be held at Aslib on Monday and Tuesday 22nd and 23rd February. The course will be concerned with co-operation in handling inquiries and translations as well as with interlibrary loans. The first day will be mainly devoted to descriptions of a number of the organizations engaged in co-operation, and the second will be concerned with planning to ensure that the best use is made of such services; the course will end with a general discussion. The fee for the course will be 6½ guineas. A leaflet describing the course is enclosed with this issue, and applications to attend should be made on the form contained in it.

A New Government Information Organization

In its seventeenth and (because of forthcoming changes in the administrative machinery for scientific policy) last annual report,* the Advisory Council on Scientific Policy recommends the establishment of a new Government organization for scientific and technical information.

The need for such an organization was strongly urged upon the Minister for Science by Aslib when it became clear that the Trend Committee on the organization of civil science had not considered in detail the place of information services in the proposed reorganization. Outline proposals were subsequently developed under the aegis of the DSIR Information Committee, and accepted in principle by the Advisory Council on Scientific Policy, which invited DSIR to set up a working party to elaborate a detailed scheme. The report of this working party, of which the Director of Aslib was a member, is the basis of the ACSP recommendation.

The main functions of the new organization are expected to include:

> Provision of advice and support in the field of scientific and technical information over the whole range of the natural sciences, their relevant technologies and related aspects of the social sciences, including advice on United Kingdom participation in the work of international agencies concerned with scientific and technical information.
>
> Promotion of research and development into *a,* scientific communications, *b,* classification, storage, retrieval and translation of information, and *c,* the operation of information services for scientists, technologists and other users.
>
> Responsibility for existing services including the National Lending Library and grant-aid to the Association of Special Libraries and Information Bureaux.
>
> Co-ordination of existing and future activities in this field nationally and internationally.

The total cost including the National Lending Library for Science and Technology is expected to be rather less than £1 million in the first year, possibly rising to £1.5 million after five years.

Consideration was given to the idea of forming the new organization as an independent statutory body on the lines of a research council; the advantages and disadvantages of such a body were discussed by Lord Shackleton in his presidential address to the Aslib 38th Annual Conference. On balance, however, it is felt that the new organization would be most effective if supported directly by the machinery of a Government Department and, in consequence, a single administrative unit forming part of the Department of Education and Science is envisaged. It would be guided in its work by an independent committee appointed by the Secretary of State.

Aslib warmly welcomes the prospect of this new initiative which clearly reflects the importance which the Government now attaches to scientific and technical information. It should prove to be a landmark in the development of information services in this country.

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* Cmnd. 2538. H.M.S.O., December, 1964.

Aeronautical and Technical Translation Groups Conference

Some new announcements have been made about the joint conference, to be held from 1st to 3rd April. The Aeronautical Group programme will include a paper by Mrs V. A. Dowd of the SHAPE (Supreme Headquarters Allied Powers, Europe) Technical Centre; and the subjects of the TTG papers will be translation from the Russian (by Dr Goyer) and learning Japanese (by Mr Wallwork). Other preliminary details of the Conference were given in the December 1964 issue of *Aslib Proceedings*.

New Aslib Publications

Two new Aslib publications are announced for January. One is the *Index to Theses accepted for higher degrees in the universities of Great Britain and Ireland,* volume XIII, covering 1962–3, edited by Geoffrey M. Paterson. The price is 27*s* to members of Aslib, 36*s* to non-members.

The other title is *Looking forward in documentation,* being the full papers of the Aslib 38th Annual Conference at Exeter in 1964. In all, it contains eighteen papers and also the summaries of discussion after each session. The price is 13*s*.

Both publications are on sale from Aslib. Instructions for ordering are enclosed with this issue of *Aslib Proceedings.*

FID Congress in Washington

The 31st Meeting and Congress of the International Federation for Documentation (FID) will be held in Washington, D.C., from 10th to 16th October 1965. This will be the first occasion on which an FID Congress has been held in the United States of America. The programme will be divided into six major areas: education and training of documentalists, organization of information for documentation, systems design, information needs of science and technology, information needs of society, and principles of documentation, for which papers have been invited.

The conference will meet at the Sheraton Park Hotel and will be preceded from 7th to 9th October by closed meetings of the General Assembly and Committees of FID.

Aslib wishes to ensure that the United Kingdom is well represented. Those intending to take part are asked to notify the Director at 3 Belgrave Square, London SW1, in addition to registering with the Secretariat, 1965 FID Congress, 9650 Wisconsin Avenue, Washington, D.C. 20014, USA.

Science Citation Index

On Monday 15th February Dr Eugene Garfield, Director of the Institute for Scientific Information in Philadelphia, will conduct a seminar on his *Science Citation Index* at the London Hilton Hotel, Park Lane, London W1. There will be no charge for attendance. Refreshments will be served.

The seminar is one of a series being given in Europe on the Citation Index; it will also include discussion of the new *Automatic Science Citation Alerting* (ASCA) service. Further details about this seminar are available from Aslib, on request.

Committee on Latin America

The Committee on Latin America was set up in 1963 in consequence of a meeting at Canning House of librarians and other representatives of government departments, firms, and other institutions, together with members of the Aslib Economics Group, under the Chairmanship of Sir John Walker, Director-General of the Hispanic and Luzo-Brazilian Councils. The Committee set about the implementation of three projects connected with Latin American studies and the availability of information on the area: (1) compilation of a union list of serials on Latin American economic and social topics; (2) compilation of a guide to resources in the same field; (3) compilation of a descriptive guide to the contents of source material.

The first of these projects is now well under way, and a list of serial titles was distributed to a wide range of libraries believed to have collections on Latin America. This list was compiled primarily by Dr A. J. Walford, Librarian of the Ministry of Defence, Mr G. H. Green, Librarian of the Hispanic and Luzo-Brazilian Councils, Mr K. A. Mallaber, Librarian of the Board of Trade, and Miss Rosemary Mason, engaged in research at the Institute of Economics and Statistics of the University of Oxford. The object was to discover what holdings existed in the United Kingdom and to learn what related titles might also be held. A number of libraries have already responded and the replies are being collated by the National Central Library in connection with the work of BUCOP. Even at this early stage, however, it is clear that there is a serious scarcity of these titles in the United Kingdom.

It may be that there are libraries with useful holdings of serials from and pertaining to Latin America which have not received copies of the list sent out from the NCL. It would be appreciated by the Committee if any librarians who feel they might be able to help and who have not received the list would get in touch with the National Central Library, Malet Place, London WC1 (telephone Euston 6262).

Third International CIB Congress

The International Council for Building Research, Studies and Documentation (CIB) is to hold its third congress in Copenhagen from 23rd to 28th August 1965. It will be open both to members of CIB and to others who are interested in taking part. The theme of the congress is the various ways of procuring such industrialization of the entire building process as would be needed to meet the constantly increasing quantitative and qualitative building needs in different regions of the world. The programme will concentrate on papers and discussion on a number of subjects or subject groups linked to the main theme. Anyone who would like further information is invited to write to the General Secretary of CIB, P.O. Box 299, Rotterdam, Netherlands.

Architecture Index

Nottingham Public Libraries have inaugurated a monthly index of periodical articles called *Architecture and Town Planning,* designed to keep architects and local government officials in the area informed of current developments within their fields. In response to demand it is now being circulated further afield and to libraries, schools of librarianship and others. Photocopies of the articles listed can be supplied. Copies of the index may be requested from the City Librarian, City of Nottingham Public Libraries, South Sherwood Street, Nottingham.

Lloyd's Register of Shipping

A reception was held at the British Museum on 4th December to mark the handing over of the original Lloyd's registers, dated 1764 to 1833, to the care of the British Museum. These volumes, many of them unique copies, are on permanent loan to the Museum where it is thought they can best be preserved. A set of reprints is also available there for everyday use, and another set is at Lloyd's Register in place of the originals. Five volumes of the 'red book' (*Shipowners' register*) and nine volumes of the 'green book' (*Underwriters' register*) are still untraced and any help which can be given in finding these volumes will be appreciated. They are the *Shipowners' register* for 1799, 1803, 1807, 1808, 1817; and the *Underwriters' register* for 1767, 1772, 1773, 1774, 1775, 1777, 1785, 1788, 1817. Inquiries should be made to Lloyd's Register of Shipping, 71 Fenchurch Street, London EC3.

Monastic Manuscript Microfilm Project

A long-term programme to microfilm the manuscripts of several European and Near Eastern monastic libraries has been initiated under a grant to St John's Abbey and University, Collegeville, Minnesota. The aim is to make these collections available for the first time to scholars and students in the United States. Further details of the scheme may be obtained from the Librarian of the Abbey, The Reverend Oliver Kapsner, O.S.B.

The Science of Science

This book marks the twenty-fifth anniversary of the publication of J.D. Bernal's *The social function of science* and pays tribute to its author. Royalties from the book will be used to set up a Science of Science Foundation, which 'will promote the application of scientific methods to the understanding of science itself, especially in its relations with society.'

The fifteen contributors to *The science of science*, eight of them Fellows of the Royal Society, include Herbert Coblans of the Aslib Research staff who writes on the communication of information, with special reference to Bernal's influence in this field. Professor Bernal has been a member of the Aslib Research Committee from its start and is the DSIR nominee on the Council of Aslib.

The science of science is edited by Maurice Goldsmith and Alan Mackay, and is published by Souvenir Press at 30*s*.

A Technologist Remembers

Professor R. S. Hutton, a Founder Member and a Past President of Aslib, looks back on a long and active life in *Recollections of a technologist* published by Pitman at 25*s*. The story is fully as exciting as the first introductory sentence would suggest: 'Born in 1876, I have witnessed during my adult life the birth of the automobile, the aeroplane, wireless, and electronics, which have revolutionised present-day life.' Members will wish to read this remarkable record not only for the light which it sheds on the development of technology during the past sixty years, but also for the illuminating references to library and information matters to which the author brings the same discernment and enthusiasm as to his principal field of activity.

Rutgers Seminar

The speaker at the next Rutgers Seminar will be Mr B. C. Vickery, Librarian of the Manchester College of Science and Technology. Mr Vickery will discuss the work of the Classification Research Group, of which he is an active member. The seminar will be on 1st and 2nd March and details can be requested from the Graduate School of Library Service, Rutgers—the State University, New Brunswick, New Jersey 08903, USA.

The Use of the Chemical Literature

A short course is being organized by the Liverpool College of Technology in conjunction with Liverpool Public Libraries and LADSIRLAC from Wednesday 17th February to Friday 19th February 1965. The course will consist of directed library work and lectures given by chemists and librarians. It is designed to show librarians and newly qualified chemists in research and industry what information is contained in the chemical literature and how to retrieve it.

Further information may be obtained from Dr C. B. Clarke, Department of Chemistry and Biology, College of Technology, Byrom Street, Liverpool, 3.

THE DISSEMINATION OF PUBLISHED INFORMATION TO THE EXECUTIVES OF A MAJOR STEEL GROUP

R. HINDSON, A.L.A.

Information Officer, Colvilles Limited

Chairman, Julian Blackwell, a Director of Blackwell's, Oxford
Evening meeting, London, 26th November 1964

THE British iron and steel industry has long been conscious of the need to provide facilities for the free interchange of relevant information. It was, in fact, the consciousness that the free interchange of information is necessary to a prosperous industry which led to the establishment of the Iron and Steel Institute in 1869.[1]

Today, the Iron and Steel Institute has an international reputation for its activities in the field of information collection and dissemination. The Institute undertakes all the normal activities one associates with such a body; that is, the organization of conferences, meetings, visits to plants both at home and abroad, and the provision of information and library services. To those of us who are concerned with published information, it is the latter activity which merits our particular attention. The development and present state of these services have been excellently described by M. L. Pearl.[2] Briefly, the present services are:

1. The Joint Library, run in collaboration with the Institute of Metals, which is undoubtedly the chief metallurgical library in Great Britain.
2. The Information Department, providing the usual information services, the important function of which, insofar as the information services of companies are concerned, is the provision of ABTICS (Abstract and Book Title Index Card Service).
3. Bibliographical Series of the Institute. These are published bibliographies covering various subjects of great interest to the industry.
4. British Iron and Steel Industry Translation Service (BISITS).[3] As from May, 1957, the major iron and steel companies of the United Kingdom, in co-operation with the Iron and Steel Institute and BISRA, formed a translation pool, which is now self-supporting, and a major source of English translations of foreign literature pertaining to the iron and steel industry.
5. *Stal* in English. By arrangements with the DSIR, the Institute publishes a cover-to-cover translation of the Russian periodical *Stal.*

The overall activities of the Iron and Steel Institute in connection with what is basically technical literature are supported by the British Iron and Steel Federation in the realm of economic literature, and by BISRA in connection with the research activities of that Association. In view of the very wide scope of the services provided by the Institute and the Federation, by common consent BISRA confines its activities to making available the results of its research work to the widest possible public.[4]

Various sectors of the industry support research associations active in fields of research of most interest to themselves. Also many companies subscribe to the support of research associations, although only a small part of their work is of direct interest to them. Of over fifty DSIR-supported research associations,[5] the following are active in fields of interest to the iron and steel industry.

1. British Cast Iron Research Association.
2. British Ceramic Research Association.
3. British Coal Utilization Research Association.
4. British Coke Research Association.
5. British Glass Industry Research Association.
6. British Non-Ferrous Metals Research Association.
7. British Ship Research Association.
8. British Steel Castings Research Association.
9. British Welding Research Association.
10. Cutlery and Allied Trades Research Association.
11. Drop Forge Research Association.
12. Electrical Research Association.
13. File Research Council.
14. Research Association of British Paint, Colour and Varnish Manufacturers.
15. Spring Manufacturers' Research Association.
16. Production Engineering Research Association.
17. Coal Tar Research Association.
18. Aslib.

Arrangements exist for collaboration by BISRA with the first fifteen of these.[6]

Most of the above Associations provide access to the specialized literature of their fields of interest by means of abstract services. Also, they generate a considerable literature themselves in the form of research reports. These are recorded in the usual bulletins and lists.

If it is borne in mind that ABTICS alone covers around 9,000 technical papers per annum, taken from over 1,000 periodicals, then it is likely that at present between twenty and twenty-five thousand papers of interest to the iron and steel industry are published annually. Naturally, the number published is increasing year by year. If the research reports, patent specifications, books, manufacturing specifications and so on, are added to the technical papers, then it is clear that there is a very considerable body of literature relating to the iron and steel industry.

The Colville Group of Companies, being one of the major steel groups of the United Kingdom, subscribes to many organizations, with each of which the

Group maintains close contact through one or more executives. For example, the Colville Group maintains close contact with eight research associations. Much published and unpublished material flows into the Group from these organizations and from other sources throughout the world. Naturally, many periodicals are received, these being as far as possible the key periodicals in technical fields affecting the activities of the Group. It should be clearly understood, as far as the iron and steel industry is concerned, that even if a company is operating in an entirely home market, it cannot afford to ignore developments overseas. The iron and steel industry is an international industry and at present it is important to ensure that any given steel company receives published information from within the United Kingdom itself, the United States of America, Canada, Germany, France, Sweden, Italy, Japan, the USSR, and the Eastern bloc countries and Australia. No doubt this list will grow longer as years pass.

It is in this volume of literature from so many sources that the kernel of the problem lies. How is the Colville Group, or for that matter any individual group or company, to be sure that its executives are kept aware of developments in their own and other fields which may affect the Group's activities? This problem was raised by Carter and Williams[7] in 1959. Although an increasing number of companies are raising the calibre of their executives by management development and training schemes, the strange fact is, however, that as far as the author is aware, no Group other than Colvilles is evolving a scheme which ensures that once managers and specialists are appointed to their particular posts, they are kept informed of developments relative to the posts which they may hold at any particular time. The Johnson Publishing Company of Chicago has a library for the use of executives, but this operation does not appear to be exactly similar to the Colville scheme.[8] No amount of management training will keep a man abreast of all developments, technical or otherwise, in his field. In fact, this is not the function of management training. It is unlikely that an executive will receive, through his own connections, published information regarding all developments of interest to him. If he did, the amount of time he has available each week for reading[9] would not be sufficient for him to read all the actual texts received. Should he embark upon organizing the supply, storage and retrieval of all the information likely to be of interest to him, he will quickly find that he has begun an impossible task.

In view of this situation, the Colville Group of Companies has established an Information Service under the aegis of the Central Research Department of the Group 'with the object of assisting senior executives to keep abreast of technical developments as described in the literature'. The service is not intended to replace the informal information network of which all executives are a part. It is intended to complement the executives' own sources in this field and to ensure that each individual executive is provided with a far wider range of information than he would otherwise have and to make certain that he can obtain published information as and when he requires it.

At present the Information Service provides full facilities for fifty-one executives. These executives hold key positions in the Colville Group of Companies. These Companies are:

Colvilles Ltd
Govan Shafting and Engineering Works
The Lanarkshire Steel Co. Ltd
Smith & McLean Ltd
The Etna Iron and Steel Co. Ltd
The Clyde Alloy Steel Co. Ltd
Fullwood Foundry Co. Ltd
Colville Constructional Co. Ltd
Shapfell Limestone Ltd
Blanchland Fluor Mines Ltd
Colville-Clugston Ltd
Colvilles, Shanks and McEwan Ltd

The latter two companies are regarded as associated companies. Except for Blanchland Fluor Mines Ltd and Shapfell Limestone Ltd, the works and offices of the Group are located in Glasgow and the Clyde Valley area of Scotland. The two exceptions are located in County Durham and at Shap near Penrith. The Group's annual ingot capacity is 3.3 million tons of steel,[10] and in fact it produces roughly 80 per cent of the total steel production of Scotland. It ranks as one of the five major steel groups of the United Kingdom. It is a completely integrated Group insofar as the production of steel and steel products is concerned, and probably has the widest range of steel products of any major British steel company. The total number of people employed is around 18,500. The Group has the usual specialist departments such as the Central Research Department, the Quality Control Department, the Operational Research Department, a Department providing Technical Services for the Blast Furnaces, and so on.

In pursuit of its objective, the Colville Information Service, through the staff of the Information Office, searches incoming literature for relevant items in accordance with a planned programme. Many periodicals are received by the Information Service, but only twenty-six are regularly examined by the Information Office for relevant papers and articles. This is because it is considered that these twenty-six periodicals contain the greatest amount of information which is likely to be of immediate value to the executives of the Group. These twenty-six periodicals range from *Stahl und Eisen* to the *Journal of the Mechanics and Physics of Solids,* and include such periodicals as *Tetsu-to-Hagane Overseas, Metals Science and Heat Treatment, Sheet Metal Industries* and *Metallurgia.*

This basic searching of original periodical literature is supported by the searching of abstract services. By this means it is possible to cover a very wide range of periodicals and subjects and thus be fairly certain that most important articles are in fact selected for notification. The abstract services and publications at present utilized by the Information Service for this purpose are:

ABTICS (*Abstract and Book Title Index Card Service*)
Engineering Index (*Monthly Bulletin*)
BSCRA Abstracts
ASM Review of Metal Literature
Analytical Abstracts

Bulletin of the British Non-Ferrous Metals Research Association
BCIRA Journal (*Foundry Abstracts*)
Coke Review
Nuclear Science Abstracts
PERA Bulletin
The Nickel Bulletin
Zinc Abstracts
British Technology Index
Bibliographical Bulletin for Welding and Allied Processes [5,11]

ABTICS and *Engineering Index* give general coverage of periodical literature relevant to the iron and steel industry, while the other services provide deeper coverage of specialized subjects. In some instances patent specifications and books are covered besides the periodical literature.

Although most of the executives of the Colville Group can make sense of papers and articles in at least one language other than English, it is necessary to provide translations of a considerable number of articles. This is because relevant papers are written in such a wide variety of languages that no executive could hope to be able to read them all. The iron and steel industry is very fortunate in the fact that it has two major sources of English language translations; namely BISITS and the Brutcher organization. By utilizing the resources of BISITS and Brutcher with cover-to-cover translations of Russian periodicals, it is possible to provide a considerable amount of translated material without resorting to specially commissioned translations. The periodical *Technical Translations* is also very useful in this respect. However, if full advantage is to be taken of external sources of translations, it is necessary that a person not only competent in actual translating, but also conversant with translation activity in general, is available in the Information Service. By all these means the Colville Information Service maintains an adequate flow of English language versions of important foreign papers.

Coverage of British patent specifications is achieved by utilizing British Patent Abstracts. At present not too much attention is paid to foreign patent activity, because in present circumstances, it is considered that most, if not all, of the important patents which may affect the activities of the Colville Group are in fact lodged at the British Patent Office within a reasonable period of time. However, lists of patents are received from various continental patent searchers, and from time to time, foreign specifications concerning products and processes of particular interest to the Group are selected.

During 1963 it was realized that while a considerable amount of information, generated by the research associations which the Colville Group supports and by other organizations such as the National Engineering Laboratory, came into the Colville Group, it was not certain that anyone who might be able to apply certain information actually heard about it. Therefore, as from September 1963, a search programme was instituted which now entails selecting relevant items either from the actual reports or from the lists of reports distributed by the various research associations and the reports available from other research organizations.

For books the Information Service relies on ABTICS, book reviews in pertinent journals and periodicals, the Book Information Service of Blackwells, and similar services. Also the Information Service has an arrangement with one of the Glasgow booksellers whereby copies of new books thought to be of use to Colvilles are sent to the Information Service on approval. By these means a fairly reasonable coverage of books for notification is achieved.

All items selected as being relevant to the activities of one or more executives are notified to the executives concerned by means of a series of abstract notification sheets. The number of items notified to each executive is related to his ability to absorb information as indicated by the records of the Information Office. This absorption ratio is not strictly that of one individual, since each executive is expected to pass to his subordinates literature of particular relevance to their activities. The abstract notification sheets used cover the undermentioned categories of literature.

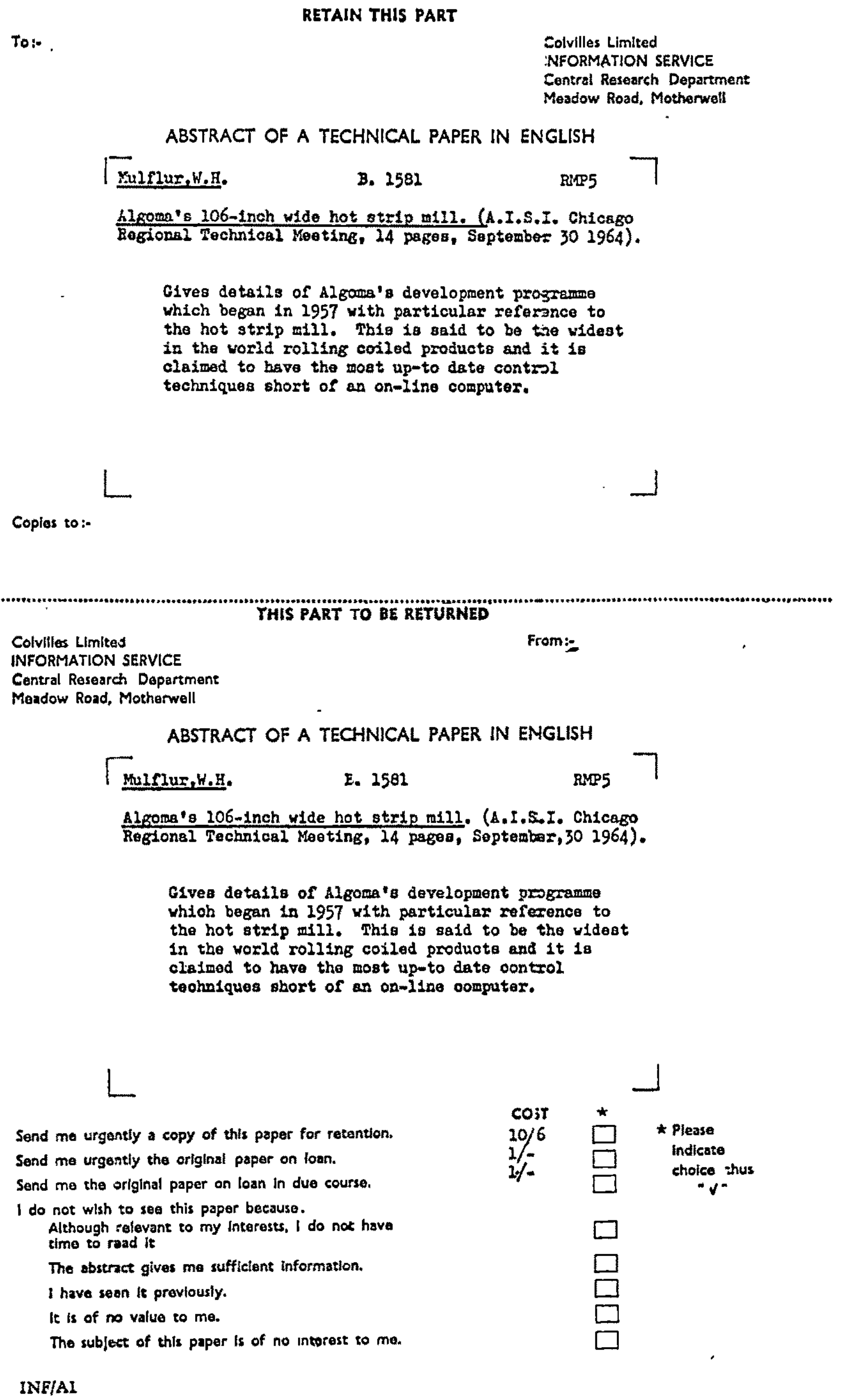
A1 Technical articles in English.
A2 Technical articles in translation.
A3 Technical articles in a foreign language.
A4 Patent specifications.
A5 Research reports.
A6 Books and pamphlets.

Different coloured sheets are used for each category:

A1—white: A2—yellow: A3—pink:
A4—blue: A5—green: A6—orange.

The Colville Information Service uses abstract notification sheets as the primary method of information dissemination rather than a library bulletin or a contents list, for a variety of reasons. The average qualified person working for a manufacturing company probably receives as part of his technical society membership privileges, or through subscription, a published abstract bulletin which covers the literature of his field of interest. The abstract bulletin may not cover specialized publications such as patent specifications and research reports, but nevertheless, it will convey to him details of a large proportion of the literature of the subjects in which he is interested. Also every individual reads periodicals vital to him. No matter how hard the library bulletin editor tries to avoid including items detailed in published services, the library bulletin will always contain a considerable proportion of the references appearing in the published services, and a fair number of references to items already read by recipients of the bulletin. Thus part of the effort needed to produce the library bulletin will be wasted from the beginning and some of the time of the reader wasted if the bulletin is utilized as the basic method of information dissemination.

Any individual employed by a manufacturing company is only interested in a small number of subjects as compared with the number of subjects which might be covered by a library bulletin if it covers all or a number of the subjects of interest to the company. In order to discover these items which may be of interest to him he will probably have to look through a number of references to material valueless to him. Bearing in mind the pressure under which industrial staffs have to work and the small amount of time which they can devote to



RETAIN THIS PART

To:-

Colvilles Limited
INFORMATION SERVICE
Central Research Department
Meadow Road, Motherwell

ABSTRACT OF A TECHNICAL PAPER IN ENGLISH

Mulflur,W.H. B. 1581 RMP5

Algoma's 106-inch wide hot strip mill. (A.I.S.I. Chicago Regional Technical Meeting, 14 pages, September 30 1964).

Gives details of Algoma's development programme which began in 1957 with particular reference to the hot strip mill. This is said to be the widest in the world rolling coiled products and it is claimed to have the most up-to date control techniques short of an on-line computer.

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Central Research Department
Meadow Road, Motherwell

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	COST	*
Send me urgently a copy of this paper for retention.	10/6	☐
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Send me the original paper on loan in due course.	1/-	☐
I do not wish to see this paper because.		
Although relevant to my interests, I do not have time to read it		☐
The abstract gives me sufficient information.		☐
I have seen it previously.		☐
It is of no value to me.		☐
The subject of this paper is of no interest to me.		☐

* Please indicate choice thus "✓"

INF/A1

FIGURE I

Abstract notification sheet as used by the Colville Information Service for the selective notification of published information. (Full size 13 *in.* × 8 *in.)*

keeping up with published information, any effort devoted to ferreting out relevant information will reduce the amount of time from which they will gain profit. If we consider the working methods of the individual, we will soon realize that it is the single sheet or short item which receives preferential treatment. The magazine, the long report, the detailed memorandum, are all laid aside for later examination and consideration. The library bulletin with its mass of references and abstracts falls into this category quite easily.

Although, for the reasons outlined above, the library bulletin is not suitable for speedily disseminating details of published information, it is useful for certain defined purposes. These are:

1. As a record of published material acquired and filed by the library.
2. As a support of the primary information dissemination operation.
3. Inasmuch as what people read reveals their thinking, the material listed in the library bulletin of a manufacturing company will reveal the trend of thinking in that company.

If we bear in mind all the foregoing factors, then it becomes clear that the dissemination of information by means of a library bulletin is in fact a relatively ineffective way of speedily and accurately disseminating details of published information. A much more efficient way of disseminating details of published material is the use of individual notifications directed to individual executives, technologists and scientists. Also, the use of individual notifications offers great opportunities for the use of advanced techniques throughout the whole information dissemination operation.

Originally the Colville Information Service used four types of sheet of different design to those used now. The categories of literature covered by the original four types of sheet were:

1. Technical articles in English.
2. Technical articles translated from a foreign language.
3. Technical articles in a foreign language (untranslated).
4. Patent specifications.

After considerable thought and discussion, the different types of notification sheet were increased to six during the summer of 1963. The two additional categories covered are:

5. Research reports issued by organizations other than Colvilles Ltd.
6. Books and pamphlets.

When the decision was made to introduce two additional types of sheet, it was thought that the opportunity should be taken to alter the design of the sheets, so as to decrease the amount of handling necessary to provide the literature required by each individual executive. The principal change was from including one abstract on the sheet and a reference by means of a number to the original item, to providing two abstracts on the sheets. The sheets are perforated so that the recipients retain the upper portion with one abstract, and return the lower portion on which the abstract is also printed, together with a preprinted set of questions. All the recipients have to do is to indicate their wishes by ticking a box on the lower portion, detach and return it to the Information Service. As a completely new supply of forms had to be printed, the opportunity was taken to amend the questions to be answered so as to obtain the maximum amount of useful information but with the minimum amount of inconvenience to each individual executive. Thus the positive questions were only slightly altered so that they would assist the development of a more efficient service, and the negative questions recast so that they would give a much clearer indication of the reasons behind the negative answers. It was intended that by being able to couple immediately on the reply portions the reactions of executives to any given item, the staff of the Information Service would be enabled to make a continuous appraisal of the interests of each executive. This would allow the searching programme to be continuously adjusted so that the material notified to each executive would be that most likely to be of use to him. In other words, by utilizing a feed-back, the control would be adjusted.

By using the new sheets, the Information Service has been able to begin appraising responses to notifications and thus begin the construction of an 'interest profile' for each executive.

Each response is rated as:

1. Positive
or 2. Borderline
or 3. Negative.

These categories relate to the responses to notifications of technical papers in English in the following way:

Positive	Send me urgently a copy of this paper for retention. Send me urgently the original paper on loan. Send me the original paper on loan in due course.
Borderline	I do not wish to see the paper because: Although relevant the contents are not sufficiently important to warrant my reading them. The abstract gives me sufficient information. I have seen it previously.
Negative	It is of no value to me. The subject of the paper is of no interest to me.

For responses to notifications of translations, foreign language papers, patent specifications, research reports and books, the relationship is similar.

Although the work is in its early stages, a great deal of data of value to the Information Service staff has been clearly recorded. The interest profile of a steelworks manager now reads somewhat as follows:

Steel Production

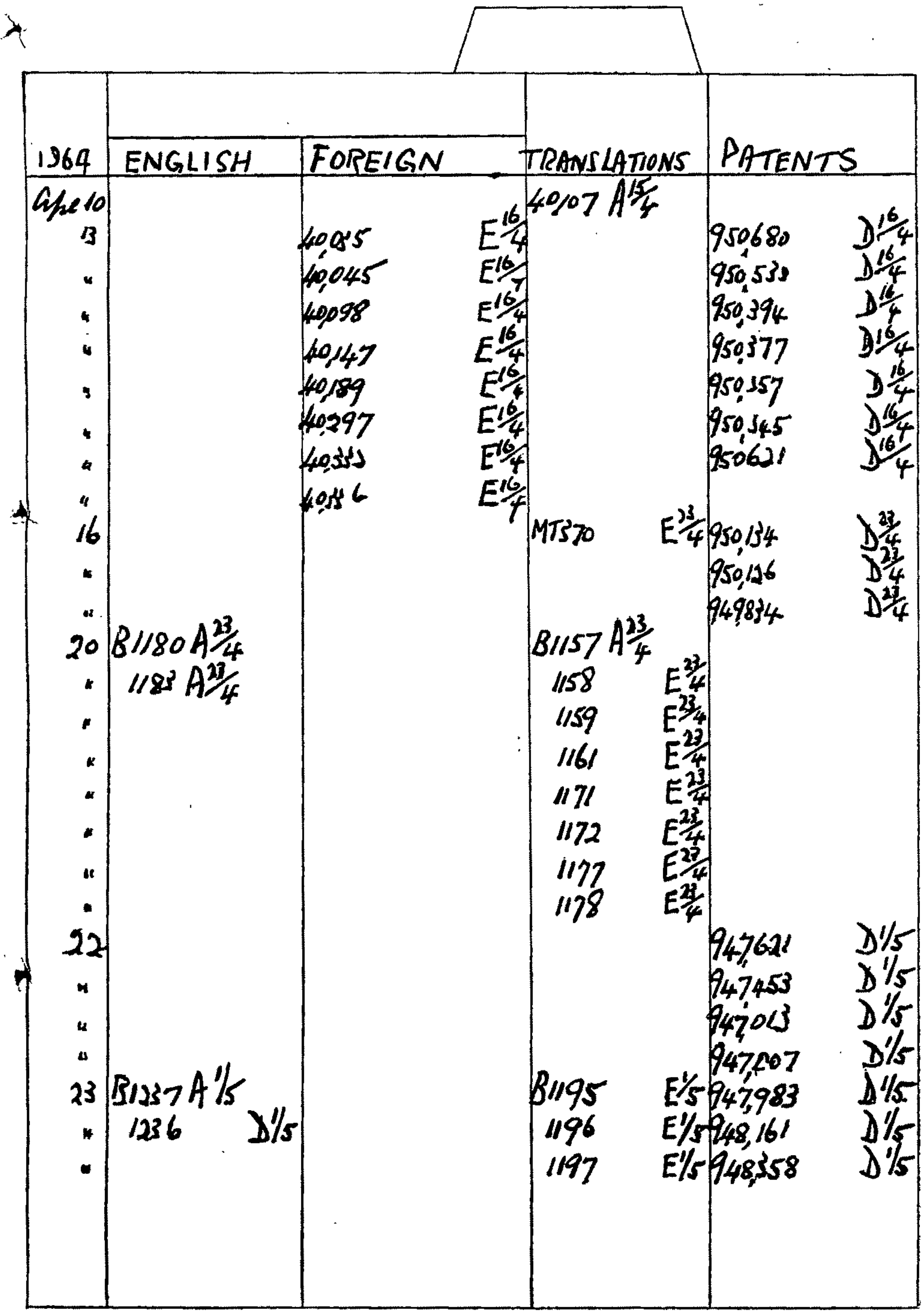
Basic causes of surface defects. Metal/slag reaction during tapping. Cooling of ingots. Developments of refractories. Rebuilding of OH furnaces. Use of fuel oil for firing.

Rolling Mills

Load and torque during rolling process. Plate mill operation. Maintenance. Mechanical properties of rolls.

General

Dispatching finished products. Internal works transport. Principles of quality control.



1964	ENGLISH	FOREIGN	TRANSLATIONS	PATENTS
Apl 10			40107 A 15/4	
13		40,085 E 16/4		950,680 D 16/4
"		40,045 E 16/4		950,533 D 16/4
"		40,098 E 16/4		950,394 D 16/4
"		40,147 E 16/4		950,377 D 16/4
"		40,189 E 16/4		950,357 D 16/4
"		40,297 E 16/4		950,345 D 16/4
"		40,333 E 16/4		950621 D 16/4
"		40,316 E 16/4		
16			MT570 E 23/4	950,134 D 23/4
"				950,136 D 23/4
"				949,834 D 23/4
20	B1180 A 23/4		B1157 A 23/4	
"	1183 A 23/4		1158 E 23/4	
"			1159 E 23/4	
"			1161 E 23/4	
"			1171 E 23/4	
"			1172 E 23/4	
"			1177 E 23/4	
"			1178 E 23/4	
22				947,621 D 1/5
"				947,453 D 1/5
"				947,013 D 1/5
"				947,807 D 1/5
23	B1237 A 1/5		B1195 E 1/5	947,983 D 1/5
"	1236 D 1/5		1196 E 1/5	948,161 D 1/5
"			1197 E 1/5	948,358 D 1/5

FIGURE 2

Part of the statistical record of the responses of an executive (Mr 'B') to notifications of published material

The success of this system depends upon the co-operation of the executives served by the Information Service. Therefore, it is important that the patience of each executive is not wearied by having more than nine or ten questions from which he can choose one to answer. It is also necessary that each question is clear cut and does not cross with any of the others.

Although this technique is very valuable, it is not used in isolation. The Information Service also utilizes the records of an executive's inquiries and such general knowledge about his activities and interests as have been gained at times of personal contact. The judicious use of such techniques enables the Information Service to maintain a worthwhile service to each of the organization's executives without unduly worrying them with questions and demands on their time.

The necessary entries in an executive's interest profile are made continuously as the reply portions are received by the Information Service. Then the replies are passed to the Information Office, where the responses of each executive to the notifications sent to him are carefully entered in his statistical record. Part of the statistical record of Mr 'B' is illustrated in Figure 2. The kind of work which a particular executive does, seems to have little effect on the scale of his response to notifications, although his reaction to individual categories of literature is different. This can be seen in the table opposite which compares the responses of a specialist manager with that of a works manager.

After this stage the replies are divided into those bearing positive responses and those bearing negative responses. The positive replies are passed to the Maclay Library, where the mechanics of supply are carried out. The negative replies are filed for future reference. Literature is drawn from the Library's own stocks, the Iron and Steel Institute Library, the National Lending Library for Science and Technology, local resources and, in many cases, from the country of origin. In general, the whole system seems to function satisfactorily, and no serious complaints have yet been received from any client. It can be accepted that the executive's need for published information is being increasingly satisfied, as the statistics indicate a fairly steady increase in the work of the Information Service.

Besides disseminating published information to the Group's executives, the Colville Information Service carries out literature searches and provides information at their request. The Service also supports the activities of the Central Research Department and provides normal industrial library services for the staffs of the Group Companies. However, any request for assistance by a person other than an executive which involves the purchase of publications or a considerable effort by the staff of the Information Service must be authorized by the appropriate executive.

For the first two years of the service two professionals were occupied in running and developing it, supported by four non-professionals and 15 per cent of the activity of the photocopying room. This has now developed into a staff of five professional people supported by six non-professional people, together with approximately 15 per cent of the effort of the photocopying room, which has, during the last eighteen months, doubled its production and increased its staff from two to three. In the early stages of the Information Service the only

STATISTICS RELATING TO ABSTRACT NOTIFICATION SHEETS SENT TO TWO EXECUTIVES OF THE COLVILLE GROUP DURING THE TWELVE MONTHS ENDED 31ST MARCH 1964

MR A.—SPECIALIST MANAGER

Category	*Number sent*	*Replies received*	*Original required*	*Original not required*
Technical articles in English	52	51	28	25
Technical articles translated from a foreign language	53	53	32	21
Technical articles in a foreign language	22	22	7	15
Patent Specifications	68	67	12	55
Research Reports	—	—	—	—
Books	8	8	7	1
All categories	203	201	86	115

MR B.—WORKS MANAGER

Category	*Number sent*	*Replies received*	*Original required*	*Original not required*
Technical articles in English	104	104	70	34
Technical articles translated from a foreign language	134	134	49	65
Technical articles in a foreign language	32	32	9	23
Patent Specifications	125	125	20	105
Research Reports	5	5	4	1
Books	21	21	10	11
All categories	421	421	162	239

person with outside experience in library or information work was the Information Officer. The other members of the staff were transferred to the Service from elsewhere within Colvilles. The purpose of increasing the number of professional staff was to bring in those skills from outside which were not represented at the senior level in the Information Service. However, Colvilles' experience shows that it is possible to integrate staff experienced in other activities with information staff to produce a high quality service.

In the future it is hoped to continue the investigation of the information needs of executives and how best they can be satisfied. In particular it is hoped that very detailed interest profiles will be developed for each client of the Information Service and that this will lead to a reasonable reduction in the number of negative answers.

Although we at Colvilles believe that our Information Service is unique, it should be clearly understood that in fact it is a development of services already available. The service has been developed without resort to exotic methods, machines and equipment. The principal factor in the success of this operation has been the fulfilment of a long-felt need by common-sense methods. One other factor which has contributed to the success of the Colville Information Service is the tradition of open co-operation and dissemination of technical information which has existed within the British iron and steel industry for many years. In spite of many criticisms which have been levelled against the industry, it is in fact amazingly receptive to new developments and information about them.

The author thanks the directors of Colvilles Ltd for permission to present this paper.

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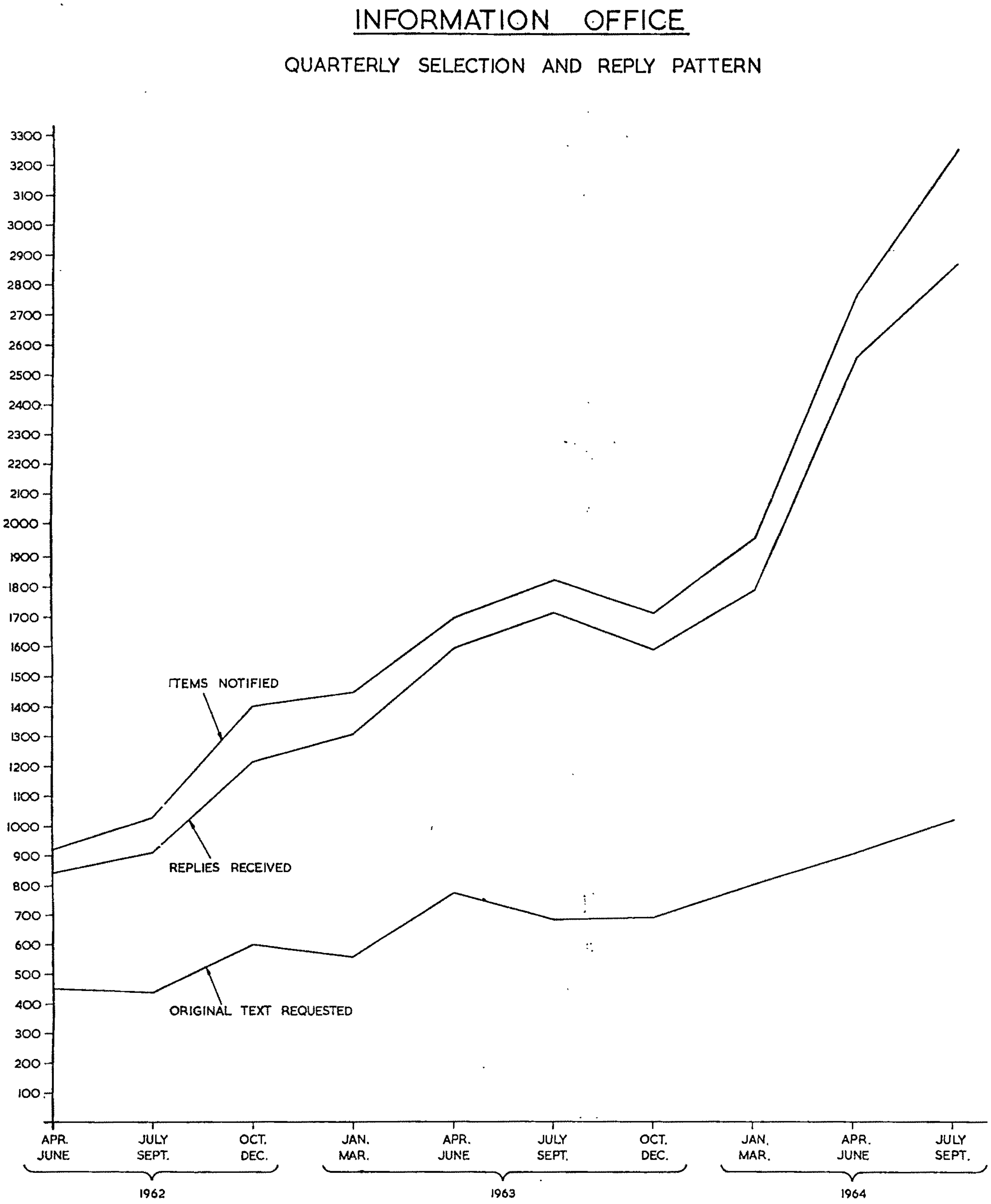

FIGURE 3

Response of executives, senior technologists and scientists to the selective notification of published information.
April 1962–*September* 1964

DISCUSSION

The questions that followed Mr Hindson's paper and his replies are set out below.

Mr G. A. Shires (Dunlop Rubber Co. RTIS) asked (1) what steps were taken to prevent executives passing on to others the originals they were sent on request, or to recover items passed on in this way. (2) Was there any similar service to provide executives with daily topical information, for example from the *Financial Times*, or other Press.

Mr Hindson: (1) An executive can decide whether or not he wishes to have an original or copy for retention. Since executives have efficient secretaries, very little of this material is irrecoverable, except for some reason patent specifications which tend to disappear. However, this problem is relatively unimportant. (2) With regard to topical daily information, the British Iron and Steel Federation provide by means of their 'green sheet' an excellent service with which we at Colvilles do not compete.

Mrs R. G. Knight (Road Research Laboratory) said, on the question of assessment of interest, that her list was checked with seniors about once in three years, and in the intervening years it was amended by information from officers by the introduction of new senior colleagues to the library and information staff.

Mr Hindson: It seems unlikely that the methods employed at the Road Research Laboratory would be suitable for executives and senior research people working in industry, as while main areas of interest change slowly, specific topics come and go rapidly. This is particularly applicable to works executives whose interests are largely dictated by the activities and problems of the works they manage.

Miss N. B. McCallum (Urwick Orr & Partners Ltd) asked if she might follow up Mr Shires' second question, by asking for any information on the requests for, and dissemination of, material pertaining to the field of management.

Mr Hindson: As mentioned before, we do not attempt, nor do we intend to attempt, to deal with daily information. However, we do handle a great deal of information on management techniques—PERT and so on—and the kind of information required by managers attending management courses. The range of subjects studied in all the various courses is wide and not strictly 'technical'.

Mr C. E. C. Hewetson (H. J. Heinz Co. Ltd) asked if the speaker had any figures indicating the number of staff required to service any greater number of executives than the fifty-one he served at present.

Mr Hindson: To serve, on the basis outlined in the paper, 250 individuals between eighteen and twenty-five information staff would be required. The actual number needed in any one operation would depend on the experience and abilities of the professional members of the staff, the quality of the juniors, the particular industry concerned, and the sources available either within the organization in question or from outside sources.

Dr D. J. Campbell (Pressed Steel Co. Ltd) asked why it was necessary to be so formal, in requiring signatures to authorize searches or to keep to users of the service. So often the person who should sign the form was away. A discreet inquiry to the section from which the inquirer came was quite adequate to assess the amount of time to be put in, if there was any doubt.

He also asked if the charges (for example, for translations) mentioned in the sheets were actually charged to the department concerned.

Mr Hindson: The somewhat formal authorization procedure employed has been laid down by the management, and naturally it must be used. In practice it is not so cumbersome as it appears. Most senior executives have assistants or deputies who will authorize action if the senior executive is away. When an information service is primarily occupied in serving the staffs of a large industrial group it is not so easy to assess the importance of an inquiry as when the information service is serving the staff of one large department in the same physical location.

There is no charge made to any works or departments for a publication or translation. The cost is given merely to assist the recipient of a notification to decide whether or not to ask for the item to be supplied.

Mrs R. G. Knight asked whether, as the number of people served increased, the information centre would not find that it had to convert its list of names to a list of subjects, with names opposite each.

252449

Mr Hindson: It is probable that this would have to be done, but a large clientele could not be served without recourse to some mechanical assistance, i.e. punched cards or a computer. This is purely a personal opinion, not company policy.

Mr J. T. Lawrence (Heywood & Co. Ltd) asked how the importance of telephone inquiries was assessed, and how the decision to allow expenditure to take place.

Mr Hindson: Telephone inquiries from executives or their immediate assistants, including personal secretaries, are accepted without hindrance. Their importance is assessed by the attitude of the inquirer. An inquiry can be a once-and-for-all query or an indication of a new long-term interest. In the case of the latter an executive will usually confirm his new interest by another call or by memo.

The decision to allow expenditure is confined to executives. The Information Service always gives an estimate of cost. It is up to the individual executive to take responsibility for that cost. In other words budgetary control is continuous and is exercised by the management, not the Information Service. All members of staff who make independent inquiries involving expenditure in the cash or time sense are referred to their managers. In some instances, of course, senior people have blanket authorization.

Mr A. R. Dodd (A.E.I., Rugby) asked if the speaker thought, on the subject of 'Executive psychology', that the appearance of a 'top' name on a circulation list had influence on the high percentage of returns which he received.

Mr Hindson: This is unlikely since, in the context of the Group staff, all the recipients of the abstract notification sheets are 'top' people in their respective spheres of operation.

Mrs E. M. Codlin (British Oxygen Co. Ltd) asked the speaker if he really meant to say that if someone telephoned for the composition of a certain steel (for example), he would not answer without authorization.

Mr Hindson: Quick reference queries are normally answered without authorization. However, if one individual uses the Information Service as a crutch over a period of time and creates an undue amount of work for the staff of the Information Service the matter is discussed with him. Such discussions usually have the desired effect. Also it must be understood that no one is prevented from using the stocks of the Information Service themselves. In fact, we positively encourage self-help.

Letter to the Editor

Madam,

With reference to P. S. Davison's letter ('Titles of scientific papers')* the first example of duplication he quotes could well be the reprinting by a commercial journal of a paper that has appeared in a Society publication. This is quite common.

In the second case this could well be duplicated research, and no amount of documentation retrieval or letters to *Nature* can avoid such coincidence.

It has happened before and it can happen again and no doubt librarians in the various technologies can quote examples in their own fields.

Yours faithfully,
F. H. SMITH,
Librarian

The Royal Aeronautical Society,
4 Hamilton Place,
London, W1
17*th December* 1964

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* *Aslib Proceedings,* vol. 16, no. 12, December 1964, p. 383.

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ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. STAmford Hill 8564.

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Appointments vacant

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Wanted

Styrene—its polymers, copolymers and derivatives, by Boundy and Boyer, published by Reichhold in 1952. Box 165, Aslib.

WANTED URGENTLY. Good copy of PEEK, F. W., ***Dielectric phenomena in high-voltage engineering.*** 3rd ed. McGraw-Hill, 1929. Offers to Librarian, U.K.A.E.A., Culham Laboratory, near Abingdon, Berks.

For sale

Unbound copies of Journal Chemical Society in good condition: (a) July–November 1923 and index, (b) 1924–31, (c) 1950–2, (d) Indexes only 1901–05, (e) Chemical Society Abstracts 1923–4. Offers please for any or all items to Box 265, Aslib.

A.S.M. Trans: vols. 32, 36–43; Brit. Jnl. Ophthalmology vols. 18–23, 26, 39–47; Chem. Soc. Ann. Reps. vols. 2[illegible], 35–38, 42–48; Chem. Soc. Jnl. 1949–50, 1952, 1958; I.E.E. JNL vols. 36–44, 46–60, 62, 64–87. Offers to Librarian, The College of Advanced Technology, Birmingham, 4.

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Write, marked "Personal", giving brief details of age, salary required, qualifications and experience to The Chief Technical Officer, Fire Protection Association, Aldermary House, Queen Street, London, E.C.4.

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compiled by the Cataloguing Committee of the Aslib Film Production Librarians Group

A code of rules designed to standardize film cataloguing procedures, for use in the film industry and in all libraries, museums and archives where film is handled. The descriptive cataloguing of complete films, newsfilms, picture material and sound material is covered; lists of abbreviations and definitions of technical terms are included, and specimen entries are shown.

June 1963

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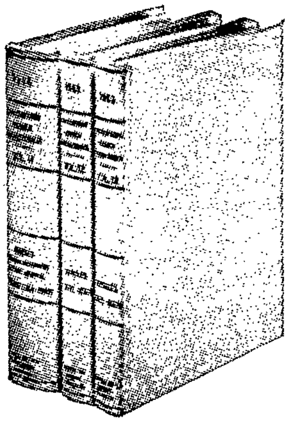

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A study by the Aslib Research Department of the foreign language barrier as it affects English-speaking scientists and engineers. Tables and diagrams in the text include the results achieved by 'Russian for Scientists' courses and a list of foreign language journals from which articles have most frequently been translated.

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INDEX a subscriber's view

Sir Harold Roxbee Cox, *Chairman of the Metal Box Company Ltd.*, writes of his company's use of B.T.I.

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Reprint of second edition

Edited by Wilfred Ashworth

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Second edition, April 1962
Second impression (*with minor alterations*), *May* 1963

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UNIVERS

ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 17 February 1965 Number 2

ASLIB CALENDAR 1965

February

THUR.25. Evening meeting at Aslib, 5 for 5.30 p.m. Paper by Timothy Raison, Editor of *New Society*.

March

WED.3. Economics Group visit to British Paper & Board Industry Research Association.

WED.3. Film Libraries Group, Shell Centre, 6.30 for 6.45 p.m.

THUR.4. Technical Translation Group meeting at Aslib, 3.30 p.m.

WED.10. Chemical Group films. See paragraph below.

WED.10. Economics Group visit to Industrial Diamond Information Bureau.

WED.17. Evening meeting at Aslib, 5 for 5.30 p.m. 'Internal dissemination of information—any questions?' See paragraph below.

WED.17. Economics Group visit to Treasury and Cabinet Office.

FRI.19. Scottish Branch one-day conference, Edinburgh. See paragraph below.

TUE.23. Midlands Branch annual general meeting, Birmingham.

TUE.23 – FRI.26. Junior introductory course to special library and information work. See paragraph below.

MON.29 – TUE.30. Repeat course on work with patents. See paragraph below.

WED.31. Evening meeting at Aslib, 5 for 5.30 p.m. 'Citation indexing', by John Martyn. See paragraph below.

April

THUR.1 – SAT.3. Aeronautical Group and Technical Translation Group joint conference at Cranfield. See paragraph below.

WED.7. Chemical Group annual general meeting. See paragraph below.

WED.7. Film Libraries Group annual general meeting, Shell.

MON.12 – TUE.13. Course, 'Background to print'. See paragraph below.

THUR.29 – FRI.30. Northern Branch conference at Ilkley.

FRI.30 – SUN.2 May. Midlands Branch conference, Cheltenham.

May

THUR.6. Technical Translation Group meeting at Aslib, 3.30 p.m.

WED.12. Electronics Group visit to IBM, Winchester.

WED.19. All-day visit to NLL, Boston Spa. Details to be announced.

MON.24 – FRI.28. Course on abstracting and co-ordinate indexing.

WED.26. Evening meeting at Aslib, 5 for 5.30 p.m.

SAT.29 – SUN.30. Engineering Group conference, Leamington.

July

FRI.9 – SUN.11. Electronics Group 7th conference, Ashridge.

Mr H.R. Verry

The death was announced on 21st December 1964 of Mr H.R. Verry, who was known to many members of Aslib. Up to his retirement in 1963 Mr Verry was Adviser on Photographic and Allied Processes to the O & M Section of the Treasury. He was the author of a number of textbooks on photographic reproduction techniques and often contributed to the book reviews in the *Journal of Documentation.*

Aslib Evening Meetings

On Wednesday 17th March the meeting will take the form of a panel discussion, called 'Internal dissemination of information—any questions?' The chair will be taken by Mr G.H. Wright, Chairman of the Aslib Meetings Committee for 1965; and the Panel will comprise the members of the Meetings Committee, Dr D.J. Campbell, Mr Julian Blackwell, Mr A.E. Cornfield, Mr P.D. Friend, Mr C.E.C. Hewetson, and Mr J.R. Sharp. The Chairman and his Panel are experienced information workers and their special hope is to be able to help some of their less experienced colleagues on this informal occasion. If any members care to send in written questions beforehand, the Panel will be glad to receive them. They must reach Aslib not later than *Wednesday 3rd March.*

Application forms were distributed with the January issue of *Aslib Proceedings.* The meeting will be at 5.30 p.m., at 3 Belgrave Square, and tea will be served at 5 o'clock.

Citation indexing: a survey. At the meeting on Wednesday 31st March, John Martyn, a member of Aslib Research Department, will describe the different sorts of citation index that are possible, and those that have actually been produced (showing copies of some) including the Garfield Science Citation Index (SCI). He will discuss the different things that can be done with citation indexes, emphasizing the fact that the librarian and the scientist have different points of view. He will suggest various strategies and give some details of his own current investigations, which serve as a rough guide to coverage, recall and 'signal-to-noise' ratio of the SCI. He will give some details of other researches on citation indexing and discuss other research approaches to the evaluation of citation indexes.

It is hoped that discussion after the talk will evoke fruitful suggestions. The meeting will be at 3 Belgrave Square at 5.30 p.m., and tea will be served at 5 o'clock.

Aslib 39th Annual Conference

The 39th Annual Conference, for 1965, will be held at the University of Keele, North Staffordshire, from Wednesday 29th September to Friday 1st October (or Saturday morning, 2nd October). Members may like to keep the dates free now, and further details will be announced shortly.

Junior Introductory Course

A junior introductory course to special library and information work will be held at Aslib from Tuesday 23rd to Friday 26th March. It is intended for students who have recently taken up junior posts in special libraries and information departments, and is designed to provide those who are occupied mainly in routine duties with an understanding of their work and its place in the organization which will help them improve their efficiency and give them an incentive to progress to more exacting tasks. The course will include lectures on various aspects of library and information work, visits to other libraries and information departments and a final discussion session which will include ways of following up the course with further study. The fee for the course will be six and a half guineas.

A programme of the course is enclosed in this issue, and applications to attend should be made on it. As these courses are usually heavily overbooked, intending students are advised to book early. Provisional bookings will be accepted by telephone or telex. Students holding a university degree or in a senior position will not be accepted for this course, and are advised to wait for the senior introductory course, which will be held in April or May.

Course on Work with Patents

The course on work with patents and elementary patent practice held on 2nd and 3rd February was heavily overbooked, and will therefore be repeated on Monday 29th and Tuesday 30th March. The fee will be six and a half guineas as before. Though this repeat course is mainly intended for those who had to be refused admission to the previous course, there will be some places available for others. Those wishing to attend may apply on the original forms issued with the February course programmes, or apply to the Education Officer, Aslib, for a fresh form.

Background to Print

An understanding of the way in which books and periodicals are produced is often of considerable help to the people who use them as sources of information. Although these subjects are covered in the professional training of librarians and information scientists, many members may not have had formal training. To help them, Aslib is putting on—with the co-operation of the London College of Printing—a course entitled 'Background to print'. Hand and mechanical composition, illustration processes, and bookbinding and warehouse techniques will be covered. There will be lectures by a publisher, a bookseller and a journal editor; and emphasis throughout will be on production methods for *modern* books. The course will be held at the London College of Printing, Elephant and Castle, London SE1, on Monday 12th and Tuesday 13th April; the fee will be seven guineas. Numbers will be strictly limited and students are advised to apply early. A full programme and application form are enclosed in this issue. Application forms should be returned *to Aslib.*

Scottish Branch

The Annual General Meeting and one-day conference of the Branch will be held, as previously announced, on Friday 19th March in the Rooms of the Royal Society of Edinburgh, 24 George Street, Edinburgh. The day's proceedings will begin at approximately 10.30 a.m. and end not later than 4.45 p.m.

The conference theme will be 'Public relations' and Mr R. Hindson, Information Officer, Colvilles Ltd, Motherwell, will speak on 'How to create mutual understanding between an information service and its clientele'. Mr A. G. D. White, Honorary Press Officer, Scottish Library Association, will speak on the services offered to readers by public libraries. The Branch Committee hopes to end the day with the presentation of an appropriate film, and is negotiating for a recent film on copying methods.

The charge for the day, including morning coffee, lunch, afternoon tea and gratuities, will be 25*s*. Applications may be sent to, and further details obtained from, the Branch Honorary Secretary, Mr W. H. Rutherford, Royal Society of Edinburgh, 22 George Street, Edinburgh, 2.

Aeronautical and Technical Translation Group

Programmes for the joint conference being held at Cranfield on 1st–3rd April are being sent out to members of both Groups. Anyone else who would like a programme should write to Mr E. J. MacAdam, Librarian, Aircraft Research Association, Manton Lane, Bedford.

Chemical Group

A new feature is being sponsored on Wednesday 10th March, when a number of colour films will be shown at 3 Belgrave Square at 5.30 p.m. These will be mainly on chemical subjects, but there will be other instructive topics and some light relief. Members of Aslib who are not members of the Group are invited to attend.

The Annual General Meeting will take place at 3 Belgrave Square on Wednesday 7th April at 12 o'clock. This will be followed by a luncheon at the Anglo-Belgian Club, 6 Belgrave Square, at 1.15 p.m. The guest speaker at the afternoon meeting will be Mr A. B. Davey of the Rubber and Plastics Research Association, on 'Co-operation in abstracting'. This will be at 2.30 p.m. at 3 Belgrave Square. The cost of the luncheon will be 25*s*. Anyone wishing to attend should write to Mr E. F. Broome, Information Officer, Beecham Toiletry Division, Beecham House, Great West Road, Brentford, Middlesex (telephone Isleworth 5151) before Monday 5th April.

Classification Society

The first meeting to be arranged by the Society will be a one-day symposium on 'The application of mathematical techniques to classification'. It will take place on Thursday 1st April, from 10.30 a.m. to about 5 p.m., at the Institute of Archaeology (London University), 31–34 Gordon Square, London WC1. There will be opportunity for brief discussion after each paper and general discussion at the end. Those attending will be expected to make their own arrangements for lunch (12.30–2 p.m.).

All members of the Society are welcome to attend and guests may be brought. Application forms have already been circulated to members and should be returned filled in by 13th March to Mr J. S. L. Gilmour (Secretary/Treasurer, Classification Society), The University Botanic Garden, Cambridge.

Evaluation of Information Retrieval Systems

The North Atlantic Treaty Organization is sponsoring an International Advanced Study Institute on the evaluation of information retrieval systems, to be held in The Hague from 12th to 23rd July. The Institute is intended for people who have done theoretical research or had practical experience in the evaluation and operation of IR systems. The programme will include lectures, seminars and discussion groups; the lecturers are Mrs Pauline Atherton of the American Institute of Physics, Mr Charles Bourne of Stanford Research Institute, Dr A. J. Goldwyn of Western Reserve University, Dr Gerard Salton of Harvard University, Mr Th. W. Te Nuyl of Shell Internationale Res. Mij, Mr J. L. Farradane of Northampton College of Advanced Technology, and Mr C. W. Cleverdon of The College of Aeronautics, Cranfield.

Meetings and seminars will be held in Het Oude Hof, the former Queen's Palace, in The Hague. There will be a registration fee of 50 *guilders* or $14 for each member not in receipt of a Fellowship. A limited number of Fellowships will be awarded to participants who might otherwise be prevented from attending. These Fellowships will cover registration fee, a grant of 250 *guilders* towards accommodation, and, for those living more than 300 kilometres from The Hague, a travel grant which will normally be 50 per cent of the economy air fare. Applications for admission should be submitted by 1st April to Mr Cyril Cleverdon, at The College of Aeronautics, Cranfield, Bedford, from whom further details and application forms may be obtained.

Library Publicity Display

The Reference, Special and Information Section of the Library Association will be holding its 1965 annual conference at Sheffield from 26th to 29th March. The theme will be 'Problems of selling library services to commerce and industry'. It is intended to have on display during the conference a collection of examples of material issued by libraries to make their services and collections known to their users. As the papers to be presented will deal with the problems affecting both large and small special libraries, as well as public libraries, it is hoped that the widest possible range of special libraries will be represented in the display. Librarians who are willing to provide specimen material are invited to send copies to Mr G. E. Hamilton, Assistant Honorary Secretary, Reference, Special and Information Section of the Library Association, Board of Trade Library, 1 Victoria Street, London SW1.

SIRA Conference

The British Scientific Instrument Research Association (SIRA) is holding an instrument industry conference on 13th–14th May at the Grand Hotel, Eastbourne. A number of short talks will be given on new materials and innovations in production techniques in the instrument industry. Inquiries and provisional bookings should be addressed to Miss A. E. S. Mills, Head of Information Group, British Scientific Instrument Research Association, South Hill, Chislehurst, Kent (telephone Imperial 5555/9).

Spectroscopy Colloquium

The XII International Spectroscopy Colloquium will be held at the University of Exeter from 12th to 17th July. The programme will contain about seventy papers covering most aspects of applied spectroscopy and the speakers include Dr H. G. Kuhn of the Clarendon Laboratory, Oxford, Professor S. F. Mason of the University of East Anglia and Dr J. H. Beynon of ICI Ltd. There will be an exhibition of scientific apparatus and books of spectroscopic interest, and visits to research establishments and places of general interest in the area. The full residential fee is £24. Application forms, which must be returned not later than 1st April, may be obtained from Mrs C. E. Arregger, XII International Spectroscopy Colloquium, 1 Lowther Gardens, Prince Consort Road, London SW7.

Council for Microphotography and Document Reproduction

The Council's second exhibition of reprographic equipment and materials—'Repro '65'—will be held at Earl's Court from Monday 15th to Friday 19th March. The Council has also recently announced the publication of the second, revised edition of *A directory of British photoreproduction services,* edited by Mr Neville Green. The price is 7*s* 6*d* to members of the Council, 10*s* to non-members in the United Kingdom and $3 overseas.

Further details may be had from the Council for Microphotography and Document Reproduction, The Library Association, Chaucer House, Malet Place, London WC1.

Colloquium on Information Retrieval

The Second Annual National Colloquium on Information Retrieval will be held on 23rd to 24th April at the University of Pennsylvania, Philadelphia, Pa. The theme is 'Toward a national information system'. The colloquium is sponsored jointly by the Special Interest Group on Information Retrieval, the Delaware Valley Chapters of the American Documentation Institute and the Association of Computing Machinery, and The Moore School of Electrical Engineering, University of Pennsylvania. Further information may be obtained from Mr Ralph Garofano, c/o Institute for Scientific Information, 325 Chestnut Street, Philadelphia, Pa. 19106, USA.

NANTIS Handbook

The second, 1964–5, edition of the *Nantis handbook and directory of resources* was published in December 1964. It covers the library resources of the members of NANTIS (Nottingham and Nottinghamshire Technical Information Service) and copies may be ordered from Nottingham Central Library, South Sherwood Street, Nottingham. The price to non-members of NANTIS is 12*s* 6*d* a copy; members are entitled to one copy each free of charge and may purchase additional copies at 5*s*.

New Russian Journals in Translation

Three new Russian periodical titles have been announced for 1965, and Scientific Information Consultants Ltd are proposing to provide cover-to-cover translations of each, on a subscription basis, at a price to be announced later.

The journals are: *Defektoskopiya* (Defectoscopy), *Zashchita metallov* (Protection of metals), and *Avtometriya* (Automatic metering). All will appear bimonthly. Members interested in the proposed translations are invited to get in touch with Scientific Information Consultants Ltd, 661 Finchley Road, London NW2 (telephone SWIss Cottage 2217).

C.B.D. Research

The *Directory of British Associations* announced by CBD Research Limited for autumn 1964 will be published in March. Advantage has been taken of delays in production to incorporate late amendments up to the end of December 1964 and the Directory will now be dated 1965. The price will be 60*s*. Orders should be sent to C.B.D. Research Limited, 57 Blandford Street, London W1.

Patent Office Publications

The progress report for the six months ending 31st December 1964 gives the following summary of Patent Office publishing during the period:

Specifications. 19,550 were printed and published and all were available on the due dates.

Abridgements

940,001–960,000 Series (last specification 3rd June 1964). The remaining 271 sixteen-page sheets were printed and published during July and August 1964.

960,001–980,000 Series (last specification 6th January 1965). 468 sixteen-page sheets were printed and published during the period.

Consolidated name index

940,001–960,000 Series. The index was published on 21st July 1964.

Subject-matter and name indexes (abridgement volumes)

940,001–960,000 Series. Twenty-one of the twenty-five volumes were distributed during August and September 1964; the remaining four were delayed because of printing errors until early November 1964. The distribution of bound volumes commenced on 25th November 1964. Four volumes will not be available until early January 1965.

CONFERENCE ON DOCUMENTATION IN CRIMINOLOGY

Attendance List

ANDRY, DR R. G., University of London Institute of Education. *Speaker.*

BLOM-COOPER, L. J., M.A., DR. JUR., University of London Bedford College.

BROWN, MURIEL, Department of Social Administration, University of Manchester. *Representing* Dr A. G. Rose.

DE JAGER, MRS M. S. C. ALEXANDER, Institute for Penal Law and Criminology, Leiden. *Representing* Professor Nagel.

DEEKS, MRS P., Aslib Research Department.

EAST, H., Aslib Research Department.

FOSKETT, D. J., Librarian, University of London Institute of Education.

GIBBENS, DR T. C. N., Institute of Psychiatry, Maudsley Hospital.

GIBSON, MRS, Home Office Research Unit.

GILCHRIST, A., Aslib Research Department.

GOODMAN, MISS, Home Office Research Unit.

HADDEN, T. B., Peterhouse, Cambridge.

HALL-WILLIAMS, J. E., Law Department, London School of Economics.

JAMES, DR T. E., Faculty of Laws, King's College London.

KLARE, H. J., Secretary, Howard League for Penal Reform.

LEWIS, SIR AUBREY, Institute of Psychiatry, Maudsley Hospital. *Chairman.*

LEWIS, PETER R., Board of Trade Library. *Speaker.*

MCCABE, MRS, Nuffield College, Oxford. *Representing* Dr Nigel Walker.

MCDONALD, IAN F., Department of Criminal Law and Criminology, University of Edinburgh.

MYERS, J. M., Technical Information Officer, Royal Institution of Chartered Surveyors, London SW1.

OLLEY, G. B., Medical Editor, Butterworth & Co. (Publishers) Ltd, London WC2.

RUSSELL, C. A. F., Home Office Research Unit.

SLATER, MRS MARGARET, Aslib Research Department.

STEINER, W. A., The Squire Law Library, Cambridge.

TAPPER, COLIN F., Lecturer in Law, London School of Economics. *Speaker.*

TUDOR, R. T., Home Office Research Unit.

WARD, MRS PATRICIA, F.L.A., Lecturer, North-Western Polytechnic School of Librarianship.

WELLS, A. J., British National Bibliography.

WILKINS, L. T., formerly Home Office.

WILSON, L. W., Director, Aslib.

WRIGHT, MARTIN, Secretary/Librarian, Institute of Criminology, Cambridge. *Representing* Professor L. Radzinowicz.

DOCUMENTATION IN CRIMINOLOGY

Proceedings of an Invitation Conference

London, 5th November 1964

Chairman SIR AUBREY LEWIS
Institute of Psychiatry, Maudsley Hospital

IN May 1964 a memorandum* on documentation needs of the social sciences was published in which it was stated that Aslib would hold a conference in the autumn of 1964 for the purpose of ascertaining from a group of social scientists the extent of their use of, and satisfaction with, existing services, and their probable response to services which might be offered. This conference was the outcome and, as was suggested in the memorandum, an interdisciplinary field, namely Criminology, was chosen. As a result of the conference, a small working party was set up to study the proposals made, to formulate plans for the future and to report back to the members of the conference.

THE PRESENT RANGE OF DOCUMENTATION SERVICES IN THE SOCIAL SCIENCES

PETER R. LEWIS
Board of Trade Library

Documentation in Criminology Conference, London, 5th November 1964

WE all know what is meant by 'Criminology', but I am not at all sure that I know any longer what is meant by 'Social Sciences'.

It is a term which has had a certain vogue in the last fifty years or so, but which even in that period has had several shifts of meaning, so that at one time it was practically synonymous with Sociology alone, and latterly it has been regarded as embracing large areas of study that have a broadly similar conceptual basis even when they do not appear to share very much in the way of common methods.

Nowadays, the phrase is beginning to take on an old-fashioned look. One hears much more frequently of a group of subjects called 'Human Sciences' that embrace some of the social sciences, but not all, just as a few years ago one began to hear of something called 'Behavioural Sciences' that seemed to be the province of people who, as often as not, were engaged in finding solutions to the same sorts of problems as occupied the social sciences. The differences in all these apparently lie rather in the methods and procedures than in the goals.

I should start, then, by saying that this review of possibilities will be mainly concerned with those fields of study in which the research methods are not primarily those of the laboratory or clinic. So it will exclude from consideration some of the great developments in documentation that have occurred in, say, the medical sciences (such as the MEDLARS programme), even though they may have as much interest for the goals we are all now pursuing as those which are included.

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* *Aslib Proceedings*, vol. 16, no. 5, May 1964, p. 163–4.

What it will deal with—because this is something about which I have some knowledge—is an area of subject matter in which the method of research consists mainly in the direct observation and analysis of social behaviour and social attitudes, and of documentary and literary evidence of social behaviour and attitudes.

The special importance of documentary and literary evidence in the social sciences is of particular interest in this connection. It is taken for granted that—in contrast to the natural sciences, where the document tends to be of little intrinsic importance, and the literature is valued chiefly in respect of its efficacy in communicating the results of research and the implications of hypotheses—the social sciences give to both the documents and the literature an additional role as objects of research in themselves. They are evidence of the phenomena which research workers and practitioners are concerned to study. This is a role which makes the documentation of social science literature something akin to a research activity in itself, and turns the performance of documentation services for one particular subject area into a matter of potential importance for all the others.

THE GROWTH OF DOCUMENTATION SERVICES

The history of documentation in the social sciences is very short indeed, and the development of comprehensive services has been slow until quite recently. No doubt the reasons for this are the comparatively recent emergence of any great numbers of fully motivated activities in the field, and the lack of priority that has been generally accorded by the community to the needs of those engaged in them.

It is hard to say, in general terms, at what point in its development a special field of study begins to feel the need for a systematic control over the documents and literature which it is producing and consuming. In many cases it seems to have been at the very point at which it has crystallized into a special field, and the compilation of a retrospective bibliography or a 'guide to the literature' has occasionally been equivalent to a flag of independence, or at least to the staking of a claim. The landmarks that stand out in what might be called the pre-war landscape, at any rate, now seem to have been the works that were erected for the purpose of mapping out the whole field of the social sciences. This kind of work is very close to the encyclopaedist's task, and indeed—although it is not predominantly bibliographical—one might truly cite as the foremost contributor to the documentation of the social sciences in the 1930's the great *Encyclopedia of the Social Sciences*.

In spite of some defects, we have been extraordinarily lucky to have had at that point in time a work of its quality. Apart from the level of its writing, it has had a most benign influence on the taxonomy of the whole field and has done much to stimulate that kind of eclecticism which is nowadays called a 'multidisciplinary approach' to the documentation of the social sciences. One wonders whether the forthcoming new edition of the encyclopaedia can do as much for our own day.

Another point at which an awareness of the need for documentation services sometimes comes upon the specialist is when he realizes that there are more people working in the field than he knows personally. Specialists, however, often take a lot of persuading that this point has been reached. In my library we tell the story of a Cambridge man who was invited to come and work in the department on a study of productivity, which was at that time a very young subject indeed. One of the products of this study was a comprehensive bibliography, which it was decided we should publish. When he delivered the manuscript, the Professor also gave us a list of something under a hundred names and addresses.

'Send a copy of the bibliography to each of these people,' he said, 'and you will have communicated it to literally everybody who is at present working in the field.'

We believed him, and sent the copies out. But, like good librarians, we also sent a copy to the British Museum. As a result of that, the bibliography was listed in the *British National Bibliography,* and in due course we received some 750 requests for copies. Some of these requests were, of course, from libraries of the sort that merely like to have one copy of every free bibliography published. But a great many of them were from other research workers in the very universities and institutions to which we had sent the first hundred. What had been overlooked was that the Professor had been speaking only to the people working at his own level, and that by communicating with them he had not *ipso facto* communicated with their staffs, or with their departments, or with people working in the 'out-stations'.

The convenience of pooling resources and information about them is a strong motive for a documentation service, and one that is usually felt quite early in the development of a specialization. Among the forms that such a service often takes, in the early stages, is the union list of periodicals, in which a number of libraries and institutions with common subject interests co-operate to provide, in one source, information about the identities, holdings and locations of their periodicals. The union list can be extended to cover other sorts of library materials, as the Institute of Advanced Legal Studies in London has used it to assist in the rationalization of law literature provision in the United Kingdom.

The most impressive example of a union catalogue of books in the formative period of the whole of our subject area was, of course, the *London Bibliography of the Social Sciences,* which in its earlier volumes displayed the resources of a number of other important libraries as well as those of the London School of Economics. The later volumes of the *London Bibliography* are virtually the current catalogue of the British Library of Political and Economic Science at the London School of Economics, and since this library is the nearest thing we have to a national reference library for the social sciences as a whole (and the nearest we are likely to get, perhaps for many a day), they fill an important role as a kind of bibliographical quarry, from which the rest of us in less extensive specializations can sometimes find rough lumps of material suitable for carting away and sculpting to our own designs.

Remarkably few of the large number of learned societies and professional institutions within the social sciences seem to attach a high priority to the task of assembling information about the current output of relevant published material in their fields. It is a constant surprise to discover, for example, that the Royal Institute of Public Administration, though its own publications are of the highest quality, is content to confine its bibliographical activities to a far from extensive review section in its journal and—if it is permitted to say so—a not particularly useful list of the new books and articles in its library. Even the Royal Statistical Society, with its fine collections and long history, has not made quite the contribution that might have been expected from a body whose members seem to have a great professional appetite for print. The RSS has, in fact, given us nothing of much value in this respect since its two-volume collection *The Sources and Nature of the Statistics of the United Kingdom*—a collection which may well be regarded as disappointingly incomplete, as well as in urgent need of bringing up to date. And in its *Journal* the last article of a noticeably documentational nature, a few issues ago, was an account by a statistician of how he compiled a subject index to Kendall's *Bibliography of Statistical Literature* by quasi-stochastic methods, full of classification fallacies and downright naiveties.*

There are some exceptions to this state of affairs. There is, for example, the American Economic Association, with its recently completed *Index to Economic Journals*, its current series of surveys on economic thought in various foreign countries, its systematic listing of new books in the *American Economic Review*, and its part in the formation of the *Journal of Economic Abstracts*. Nearer home, one thinks of the activity of the Royal Institute of International Affairs in the documentation of books, journals and the newspaper press, and its work on the primary sources within its field, such as the *Documents on International Affairs*. Certainly, the possibilities of documentation services through the organization of a central professional association or learned society are not to be disregarded, merely because in some specializations in the social sciences they have not been fully realized.

SURVEILLANCE OF CURRENT LITERATURE

The most frequently found documentation service in the specializations of the social sciences is the current bibliography of new books. This ranges from the accessions list of a single important library to a later comprehensive survey of literature such as is attempted, for example, in *Année Sociologique*. Sometimes the bibliography is written up in the connected prose of an authoritative commentary on the 'Year's work', as for example in the *Yearbook of World Affairs*. One of the limitations of the 'Year's work' survey is that there are still many specializations (librarianship is one) in which the small size of the significant literature does not permit a marketable size of volume more frequently than every three or five years or so.

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* Healy, M. J. R. A subject index to the Kendall–Doig Bibliography of statistical literature. *Journal of the Royal Statistical Society, Series A*, vol. 126, 1963, p. 270–5.

Many of these bibliographies of current literature include journal articles and papers as well as books. Unless they are firmly based on the intake of new material by a large, rich and outward-looking institution or library (and there are few of these in the United Kingdom, at least), these listings have a tendency to be parochial, or at best to work on the assumption that all the important literature is being published in only a few recognized languages or countries. Those specializations that are embraced by active international organizations are sometimes better served than this—and indeed, we have as a kind of basic documentation for the whole social science field the four annual volumes on economics, political science, sociology and anthropology which comprise the *International Bibliography of the Social Sciences.*

Unesco and the International Committee for Social Sciences Documentation have devoted some of their resources to widening the area surveyed for this bibliography, and several bibliographical listings have been produced with the design of documenting the contributions of Asian countries. These regional bibliographies show many signs of the difficulties that beset their creation: anyone who has observed from a distance the unfolding story of the service which began life in the early 1950's as *Social Science Bibliography, India* and has now (or, at any rate, when last heard of), having absorbed another service called *South Asia Social Science Abstracts,* turned itself into *Southern Asia Social Science Bibliography* (*with Annotations and Abstracts*), has learnt something both of the problems of arranging coverage of specialized literature outside the easy reach of Western Europe and North America, and of the importance which practitioners attach to the documentation of the work that is being done in Asia and the Far East.

It seems to me—and here I am not referring in particular to the Asian bibliographies—that there are some areas in the documentation of the social sciences in which there are things that so need doing that they are worth doing badly, if that is the only way they can be done. A regular current bibliography of new work is perhaps one of them. But just as there are some minimum standards of description, comprehensiveness and relevance below which even mediocre documentation services should not fall, so there are maximum limits of infrequency and dilatoriness beyond which the reporting of work as new is scarcely worth doing. There are still some specializations whose bibliographies overstep these limits.

Indexes and abstracts

Chesterton's aphorism about doing things badly has no merit at all, in my opinion, when it comes to the making of indexes and to the setting up of indexing services to serve the needs of a particular subject field.

An indexing service is one which provides a collective current index to the contents of periodicals, pamphlets and books, with cumulations of entries. The best of these, such as the *Public Affairs Information Service,* are in fact remarkably speedy in reporting sources of information over a very wide range of subject matter. They achieve speed inevitably at the expense of discrimination, and *PAIS,* in reporting practically everything of importance in English within its range, also reports much that is not. Besides, unlike the law indexing services which serve the legal profession, its presentation tends to be restricted by the needs of administrators and business practitioners. It is, I think, true to say that speedy and comprehensive indexing services in the social sciences have so far been achieved only in law and in that range of subjects within the field of economics which are of particular interest to the business community. It is perhaps only the legal profession and the business community that can support the great expense of maintaining them.

Specializations that can be comfortably served by services less frequent and less urgent may find several examples in existence of more modest—but extremely valuable—indexes, among them the one from the institutes of education now being published by the Library Association.

The consistent relation of subject matter to a continuously organized system of index entry terms over a long period is the highest achievement of the conventional indexer's art. The value of indexing services for long-term reference and research purposes also depends, in the social sciences, partly on the indexer's indifference to the doctrinal or conceptual arguments which still bedevil some fields of activity, and which colour the terminology. This aspect, as much as any, lends interest to current experiments in information retrieval by means of 'natural language' analysis.

Such indifference is also an essential characteristic of a good abstracting service—one of the earliest forms of documentation service in the social science, but still among the least developed. The oldest abstract of all that may be said to be of relevance is *Psychological Abstracts,* which dates from 1904 and has an unbroken record that is somewhat unusual in our field, perhaps because it serves primarily the needs of medicine, which impinge on ours only at one or two points.

Abstracts are not as numerous in the social sciences as in other fields, and they have a tendency to be short-lived. The high mortality may have something to do with the sensitivity of this type of documentation service to the many unresolved conflicts of purpose, method and dogma that have beset at one time or another most of the specializations in the field. These make the establishment of relevance difficult in themselves.

But the main reason for the shortage is certainly that an abstract is a very expensive kind of service to perform satisfactorily, and that the number of people engaged in most special fields has generally been insufficient to sustain an abstract service without the prolonged financial subsidy that comes from an ideal of priorities not frequently associated hitherto with the social sciences. The crucial moment comes when the initial grant has been expended, and the necessity arises to build up a circulation wide enough to ensure survival without diminishing the intensity of coverage that is essential to those working in the centre of the subject area. So it happens that the abstracts which survive are usually those which cover a field in which there are large numbers of practitioners and research workers (e.g., the Dutch *Economic Abstracts*); or those which, in less populous specializations, achieve an international circulation across the frontiers of several subject fields as, for example, *Excerpta Criminologica.*

In some cases the focus is on a regional area, rather than a subject field; and then we get the socio-economic-ethnological amalgam of a service such as

Tropical Abstracts or *African Abstracts,* in which there is often an admixture of agricultural and rural technology. The tendency is for these to be ill-organized for the effective isolation of topics relevant to a particular specialization.

The present situation is one in which it is frequent for individual libraries to provide good and fast abstracting services and indexes for their particular clientele, but in which it is not easy to establish co-operative or comprehensive services on a wider scale for the various strata of potential users.

Evaluations

All these activities have some part to play in the evaluation of literature as well as in recording its existence. Their evaluations are more or less tacit, in a negative process of excluding material that does not meet an unexpressed criterion of quality, permanence or accessibility.

There remain one or two documentation services which consciously set out to select the best, or the most important, literature as it is published and to make recommendations. A well-known example is the quarterly *Economics Library Selections, Series I,* formerly edited at Johns Hopkins University, now from the University of Pittsburgh. This book list employs a system of ratings to indicate the level of readership at which each selected work is regarded as useful. Such a service has a primarily educational aim, and the main useful purpose for practitioners is to set standards of book provision in libraries everywhere.

The usual place for evaluation is, of course, the review section of learned journals and other periodicals. In most subjects book reviews have represented for a time almost all that is available by way of documentation of new work. This is usually in the formative period of a subject, when the outlets for discussion are in any case few.

But the main function of a review is to continue the argument to which the author of a new book has contributed; and the reviewing of new work is seldom systematic enough, or extensive enough, to play a central role in documentation. There are exceptions, of course, and some journals—for example the *American Political Science Review*—do attempt a systematic and extensive evaluation of new work, including non-book materials. And there are journals which sacrifice all reviewing space to the simple, systematic reporting of new books and articles. Such a one is the *Revue de l'Institut International de Statistique,* which has devoted much energy not only to an international bibliography of statistical literature, but also to a systematic classification scheme for this literature. (Statisticians and librarians are nowadays the only people with a high professional regard for classification as a working tool; and it sometimes amuses librarians to observe statisticians making the same discoveries and triumphantly avoiding the same traps as we had encountered twenty years or more before them.)

DOCUMENTATION OF RESEARCH

Once the pattern was a national register of research in progress, covering a large field, and smaller registers or directories of research in less extensive parts of the field, with international coverage.

But the comprehensive, fully documented and carefully indexed *Register of Research in the Social Sciences* is dead; and its only successor is the slighter, less informative and more unpretentious *Register of Research in the Human Sciences,* compiled from the Warren Spring Laboratory and exemplifying in its coverage the closer union with medical and other behavioural sciences that is currently being sought by research projects within the broad group of sociological studies inside the social sciences. (Economics is represented in the Warren Spring Laboratory *Register* only in the minor aspect of 'Social Economics'.)

The international registers and directories of research in smaller parts of the field have, however, survived fairly well; and plainly this is because it is easier to collect information about research in small fields than in large, and because national barriers to communication of research have had little place in those disciplines whose activities have had little interest for national security. A large proportion of research in the social sciences takes place in the United States, and it is from the United States that much of the documentation of research originates—hence a tendency to under-emphasize the work of research workers in Europe, and a preponderance of reporting of English-speaking projects. Some of this documentation is financed directly by American federal government agencies (for example, the six-monthly *Library Research in Progress*); and some by the wealthier professional and learned associations and institutions.

Contributions from international organizations to the documentation of research, including those of Unesco and the various international committees associated with it, have been usually restricted to the recording of research institutions and aims, rather than to research projects, in directories and in statements in the *International Social Science Journal,* etc.

The main problem common to all these activities is to construct a consistent and useful definition of 'research' that will distinguish the empirical discovery of new knowledge from the purely contemplative development of ideas or postulates towards the solution of social problems. The two strains are not easily distinguishable in any of the social sciences, largely because of the absence of experimental methods resembling those of the natural sciences. Much documentation of research in all fields includes in consequence a good quota of mere 'noise'.

LITERARY SOURCE MATERIALS

The activity in which above all documentation services have a key role in the social sciences is the correlation, classification and mobilization of the documents and literature which serve in part as the raw materials of research and practice.

These raw materials range from the texts of statutory instruments and treaties to the reports of cases in municipal and international courts; from the published volumes of statistical returns to the census enumerator's questionnaire; and from the anthropologist's narrative to the local newspaper report.

I do not propose to ponder here the parallel questions of collecting and processing the raw data which come—shall we say—from the field reports of representatives engaged in sample surveys, or from the standardization of clinical case-histories and the like. These are research activities which have sometimes borrowed from, and from which have been sometimes borrowed, the techniques of information storage and retrieval, but which cannot be regarded as documentation services in themselves.

We should regard documentation services in the proper sense as filling three functions, as follows:

i. Assembling the materials in a useful way

This sometimes means literally discovering the authentic texts of relevant statements and publishing them in a form convenient to potential users. Such a service is frequently provided by documentation centres in subjects such as International Law and Foreign Relations, where part of the raw material is the texts of speeches, unpublished decrees and similar fugitive utterances that would otherwise be quickly lost to proper scrutiny or that would take time to achieve a more permanent official record. These centres may also be concerned to bring together widely scattered texts into one useful context—as, for example, in Chatham House's *Calendar and texts of documents,* or the volumes of *British and foreign state papers.*

Other kinds of assembly include the organization and grouping, and the bibliographical control, of particular categories of materials, such as the Dag Hammarskjöld Library's continuous documentation and indexing of the documents and papers of the United Nations Economic and Social Council and other organs.

The functions of some government departments in making available unpublished or semi-published information collected in the course of their official duties may also be mentioned here. The quality of their work in this respect varies greatly, and one has the impression that in Great Britain, at least information is better organized and more accessible at the economics end of the social science spectrum than at the sociological end.

ii. Classifying and indexing

Here is the whole crux of those systems of information storage and retrieval which have made possible the rapid mobilization of information in many technological fields at the present day. It is here, above all, that the potentialities of high-speed mechanical methods are beginning to allure the documentalist of the social sciences.

But few subject fields have made much use of the available techniques as yet—for reasons that have been accepted perhaps overlong as commonplaces of social science information work. The most significant uses of mechanical methods are to enable searches to be made through large collections of source materials for relevant documents in related or identical fields. But machines require coded instructions, and codification supposes a standardization of concepts and terminologies that simply does not exist in most subject fields. So we have had our successes only in those fields where there has been least conflict of this sort—in dealing with legal materials, for instance, and in those subjects like industrial health and welfare which are more technological than sociological.

Many of the social sciences are still in the stage in which conventional subject indexing is the most commonly found technique for information storage and retrieval. The problems of translating the terms of inquiries into the terminologies of the literature have been met largely by the elaboration of subject-heading structures for individual subjects; and there have latterly been some interesting developments of faceted classification schemes for the whole range of social science subjects, of which those associated with Barbara Kyle and D. J. Foskett are regarded as especially promising.

iii. Preserving sources

This is a function of documentation that leads in one direction towards the possibilities of a national reference library for the social sciences (as we now have one in prospect, and almost in existence, for science and technology); and in another towards the responsibilities of special libraries for the care and treatment of the basic literature in the fields which are their concern.

There seems to be a greater absence of well-endowed libraries in the area that may broadly be designated as the sociological group of subjects than in those which mainly serve the needs of economists and the administrators of political institutions. This absence leads to a rather difficult situation for each of the subjects affected by it. The typical library in an institution conducting research or practice in a field of applied sociology or anthropology consists, more often than not, of a series of scratch collections of books and documents got together successively to service a series of limited projects. Continuity, comprehensiveness and co-operation do not seem to be highly regarded as virtues; and this appears to be true even of the collections in some university libraries.

As long as it is true, I think it likely that sociology and its related subjects will suffer from inadequate documentation services of all kinds. If this paper has a theme, it is that on the whole good libraries are the best places from which to organize and operate documentation services.

Any subject field within the social sciences which is concerned to improve its documentation services may do well to begin by considering the state of the libraries which serve it.

EXISTING DOCUMENTATION SERVICES IN CRIMINOLOGY—AND FUTURE NEEDS

mainly with reference to the United Kingdom

R. G. ANDRY

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Documentation in Criminology Conference, London, 5th November 1964

Preamble

1. Documentation in Criminology, as in other sciences, has developed steadily and is now expanding rapidly through such media as abstracts indexes, translation services, journals, etc.

2. Despite this pleasing development, a number of information retrieval problems need solving to enable the various types of professionals who use these services to keep up conveniently with the vast increase of literature on the subject. Therefore, the problem of how some of the services in this field can be co-ordinated and improved is likely to be in the minds both of 'consumers' as well as 'producers', as the contributors to these services.

3. Criminologists can call with greater success on some services than on others. Through the good offices of Aslib, it is intended at this conference to examine existing services and to discuss the manner in which further improvement to these services can be arranged for the benefit of the majority of users.

4. 'Users' might be broken down into some of the following, not necessarily mutually exclusive classes, bearing in mind that their needs are not always identical:

i. Students of criminology, who often belong to such separate disciplines as the Law, Psychiatry, Psychology, Sociology, etc.;
ii. Practitioners—probation officers, approved school, prison and borstal personnel, administrators, etc.;
iii. Teachers of criminology, drawn initially from different original disciplines;
iv. Research workers in criminology;
v. Documentation experts, for example librarians, computer machine specialists, etc.

5. Apart from 'users' or 'consumers', there are 'producers' like editors, writers, abstractors, translators, lecturers and librarians (as opposed to the role of 'user').

6. Often one and the same people may be both producers and users of criminological documentation material at different times.

7. Before examining some of the general and specific needs of the various

types of 'users', it will be expedient first to examine in Part A some of the already existing services.

8. With regard to Part B of this paper (a discussion of some of the needs in this field), it is useful to remember that criminology is a hybrid social scientific subject and as such has to serve specific as well as general needs of workers, originally drawn from different disciplines. For instance, whilst all are generally interested in criminological journals, some workers require more frequently than others specific information which has to be obtained from sources going back to their original parent discipline—that is, forensic psychiatrists and forensic psychologists need to keep up with the psychiatric and psychological literature, lawyers with the legal literature, and so on.

9. Academic and non-academic criminologists (with the exception of Cambridge which has its own Institute) tend to cluster around universities and other institutions throughout the country, and are often engaged in other than purely criminological tasks. At the moment, some of the following geographical areas seem identifiable—Scotland, the Midlands, Oxford, Cambridge, London, south of London.

10. Communication between criminologists can be complicated not only by geographical distances, but also by differences in orientation and background.

11. It is for some of these reasons that the different needs of different groups of people have to be examined alongside the general needs of most criminologists.

12. If it is conceded that a need exists for the pooling of information, it is necessary to find ways and means of doing this and also to examine the possible obstacles which might arise in terms of money, time, ideas and ultimately which kind of people are likely to use these services most.

PART A. EXISTING DOCUMENTATION SERVICES

The following list, with comments, though not entirely exhaustive, constitutes the major 'referent outlet' for the majority of British criminologists (the list is not given in any significant order). Whilst most documents are British, it is essential to mention some that are non-British as they are the basic minimum requirement for British workers in this field.

I. a. Research outlets in Britain

1. *HMSO.* Government Gazettes, White Papers, Departmental Committee Reports, Reports of Royal Commissions, Reports of Government research findings, criminal statistics, Reports of Prison Departments, Children Department, etc., and criminal law journals, especially case reports and sentencing decisions.

2. *Law Reviews.*

3. *The Home Office Research Unit.* A number of scientific papers are produced annually, often appearing in roneoed style with a relatively restricted circulation list. These papers are most informative and are of a high scientific calibre.

Recently, restricted highly technical research publications have emanated from a Police Research Unit with the Home Office.

4. *Institute for the the Study and Treatment of Delinquency (ISTD).*
   - *i.* The British Journal of Criminology (non-restricted international and interdisciplinary circulation with occasional monographs).
   - *ii.* The Library of Criminology Series—books published by Stevens & Sons, London, mainly research reports, non-restricted circulation.
   - *iii.* Pamphlets. Informative research reports published at moderate fees for a few shillings—non-restricted, but not a very wide distribution beyond membership.
   - *iv.* Bulletins and circulars containing occasional reference to on-going research—restricted to membership.

5. *University publications* of research work, viz. Cambridge, Oxford, etc. (books can be bought by the public).

6. *Criminological articles* published in journals of the parent disciplines—e.g., British Psychological Society Journals, BPS Journals of Statistics, Social and Clinical, Educational, Medical, etc., British Sociological Society, Medical and Legal publications, *Criminal Law Review,* etc.

7. *Published Proceedings,* for example of Section J and others of the British Association's Annual Conference, and the conferences of the British Psychological Society (restricted material to members and the Bulletin), the British Sociological Society, British Law Society, British Medical Society, the Society of Forensic Studies, Institute for Advanced Legal Studies, the Medico-Legal Society, etc.

8. *Brief book and research reviews* as well as short articles in journals of professional workers (e.g., *Probation Officer's Journal, Journal of Psychiatric Social Work, Case Work, Social Work,* and a bulletin published by the National Foundation for Educational Research.

9. *Brief articles* in such interdisciplinary non-technical journals as *Nature.* General articles in *New Society.*

10. *The Howard League for Penal Reform.*
    - *i.* *The Howard Journal of Penology* (an annual publication for members, obtainable also by non-members).
    - *ii.* Pamphlets—informed articles at moderate cost to members and non-members.
    - *iii.* Papers and collected evidence compiled by sub-committees, often to use as evidence before Royal Commissions, Departmental Committees, etc. (circulation restricted).

b. Some research outlets abroad—mainly international

United States

1. National (now International) Council in Crime and Delinquency.
   - *i.* Current research projects in the prevention, control and treatment of crime and delinquency.
   - *ii.* *International Bibliography on Crime and Delinquency.*
   - *iii.* *Journal of Research in Crime and Delinquency.*
   - *iv.* *Journal of Research and methodology.*
   - *v.* *Journal of Criminal Law, Criminology and Police Science.*
   - *vi.* *Mental Health Book Review Index.*

2. *Federation Probation*—(free from Washington).
3. Research reports from various leading universities.

Holland

4. *Excerpta Criminologica* (edited by Professor W. Nagel, University of Leiden Institute of Criminology) supplies an international abstracting service, for members only.

United Nations

5. *i.* *International Crime Policy Review.*
   ii. Published proceedings of five-yearly United Nations Congress on the Prevention of Crime and the treatment of offenders.
   iii. Published proceedings of United Nations Regional Conferences, Social Defence Section, Geneva.
   iv. World Health Organization publications.
   v. UNESCO publications.

Conseil de L'Europe

6. Restricted and occasional publications with reference to criminological matters.

France

7. *Annales Internationales de Criminologie* published by la Société Internationale de Criminologie (edited by Jean Pinatel).
8. Proceedings of quinquennial congress held by the International Society of Criminology.
9. International Penal and Penitentiary Foundation Studies and Monographs, published under its own auspices.
10. *Revue de Droit Penal et de la Science Criminelle* (edited by M. Ansel).
11. Publications of various ministries in France (often edited by Pierre Ciccaldi).

Other international

12. European Continental publications by Professor Corneil, Professor Wurtenberger, Professor Mergen, Professor de Tuillo and others.
13. Interpol. *International Police Review.*

II. Library outlets

1. *The Home Office*—quite an extensive library, but restricted and not available to the public.
2. *Wakefield, Prison Staff College and Training School*—(restricted).
3. *Raynor House Probation Training Centre.*
4. *ISTD*—(restricted to members).
5. *The Library of the Howard League for Penal Reform*—fairly extensive library available to members and the public.
6. *The Law Society*—(restricted).
7. *British Medical Association Library*—(restricted).
8. *Royal Society of Medicine Library*—(restricted).
9. *Library of the British Psychological Society* (housed separately in the University of London Library). Semi-restricted.
10. *University Libraries*: for example, Cambridge Institute of Criminology—an extensive library.

Oxford.
London: London School of Economics, University College, King's College, Maudsley Hospital Institute of Psychiatry, Institute of Advanced Legal Studies, Institute of Education.
Liverpool (Sections on Criminology).
Birmingham (Sections on Criminology).
Bristol, Glasgow, etc. (Sections on Criminology).

PART B.
SOME SUGGESTIONS FOR FUTURE REQUIREMENTS

Arising from the above, it is clear that different needs have to be met which might best be discussed under the following headings:

I. Needs specific to 'consumers' of criminological material
II. Needs specific to 'producers'
III. General needs.

I. *a. Needs specific to 'consumers' of criminological material*

i. Students—usually university—and researchers doing intense work in criminology, who are not already familiar with the documentation services of the subject, nor given reading lists, have often to hunt around quite extensively before they can settle down to specialized reading.

At present, there are very few libraries which display clearly a list containing the majority of documentation in this hybrid field. Furthermore, quite often because it is a hybrid field, no special sections on criminology are reserved in libraries, and this compels students of criminology to seek information at one moment in book bays reserved for sociology, at other times in law, medicine, education, psychology, etc.

Librarians, unless already taught to specialize in criminology, may often be able to give advice on some typical aspects of it, for example the law, without necessarily being able to link up such advice with more atypical aspects of criminology, such as pharmacology.

One of the answers to these problems is to train a special criminological library staff and to reserve a special corner in libraries for the subject, with a list of cross-references. This should enable students working in a book bay on criminology to pick up the threads more easily in other allied book bays.

ii. Students, no matter how conscientious they are as readers of new material, are likely to miss out the latest findings on criminology, especially discoveries in peripheral fields, unless constantly reminded of the existence of diverse journals, etc.

This touches on the need for efficient information storage of vast amounts of material (here computer machines would help). Allied to this will be dissemination problems—how such stored material can rapidly be made available to would-be 'users'. In connection with this latter point, far too few libraries have as yet a regular 'current awareness system' or card advising system, where trained library staff alert users and especially producers (for instance, lecturers) by distributing special cards on which are given short abstracts, or at least certain basic references—such as the name of the author, journal or publication, title of the article, length, and perhaps an evaluation mark as to whether an article attempts to be exploratory, with or without statistics, or is more descriptive or discursive.

Another alternative way of coping with the question of dissemination would be for trained library staff who have already abstracted the latest material, to hold regular meetings designed to alert students and researchers about the newest developments in various allied and central fields.

A really adequate display system of major current works in glass cases in common rooms rather in the form of 'appetizers' and reminders of what the library and latest offerings are, might be a useful device to overcome all too human lethargy.

iii. 'Searching services' for specific and specialized areas in criminology (for example, on material with reference to juvenile delinquency and drug addiction), whilst existing in some libraries, are not as yet a regular feature, mainly because many libraries are either too poor or not sufficently specialized. However, such services can save hours of labour if used intelligently by 'consumers' in liaison with trained library staff and many students would thus be enabled to start off a phase of research.

It is recognized that all these services will cost time and money, and are thus perhaps controversial.

iv. There seems to be an increasing need for libraries to hold regular courses designed to teach students not only such basic facts as classification systems, and how to find the material they want, but also to show them how they can build up their own reference library index at home through the systematic use of cards, indexing, and filing. An interesting article by P. L. Broadhurst (*British Psychological Society Bulletin*, vol. 17, no. 56, 1964) makes reference to what he calls his 'co-ordinate index station' which is his personal name for an arrangement of the primary reference files, the cross-references of indexing and author cards and collections of off-prints, all within reach. The 'Station' consists of a horse-shoe shaped table with a swivel chair in the middle—he does not mention whether the chair tilts backwards into the reclining position to make reading easier! Also P. T. Brown (in *Brit. Psych. Soc. Bull.*, vol. 17, no. 57, 1964) presents his simple co-ordinate indexing system (which is also of interest to criminologists). It consists of two cards, the familiar filing card containing uniterms and alphabetically filed and a second uniterm-card which is numerically filed. If each or some criminologists started such a personal system and then shared the information by groups, computers could rapidly continue with such work.

b. Some needs of 'casual' (often non-academic students) and practitioners

Probation officers and others have often a great need to consult the literature but may have difficulties in satisfying this need since they do not automatically belong to university libraries and since general libraries do not necessarily extend some of the facilities mentioned above. Their needs may be met in various ways, for instance, by issuing them with special 'readers cards' which would allow them to have easy access (including rights to borrow) to university and other, more closed-access, criminological libraries. Such workers may in particular require the assistance of a specialized and trained library staff and the use of mailing circulation lists, abstracting and literature-searching services, since they are often not as well schooled and conditioned to using libraries as are university students.

One possible palliative could be the assembling of specialized boxes, similar to the practice carried out by university extra-mural extension departments, for dispatch to geographically and psychologically isolated areas—for instance to prison officers who could institute special reading months and elect special weeks in which they could catch up with the literature or familiarize themselves with the bare minimum works in criminology.

II. *Needs of producers*

Journal editors, writers, lecturers, librarians, etc., though they are in some ways 'consumers', act in other ways as producers. As such—and in the same way as consumers—their burdens could be considerably eased if research (preceding action) could be carried out into some of the areas discussed below.

There is a need for writers to have guidance in order to enable them to assess where their 'real' market and outlet facilities lie. For instance, writers often have great difficulty in deciding whether to send an article to a journal of their parent discipline or to an allied journal or to a criminological journal, without knowing where the greatest impact is made; how well their articles are received; how long are the waiting lists. If they knew the answers to some of these questions, they may well arrange their 'genre' of writing, according to the placement of articles, to make it fit in with the general policy and background of the journal (for instance, whether to print many statistical tables, etc.). This points to the need to conduct impact and outlet surveys. In turn it points to the need of 'producers'—for example, editors—to keep in touch with their potential readership and potential writers, in order to enable them to find out what articles should be commissioned, and who should write them. This requires knowledge of the current research and researches in this country, which in turn calls for annual national surveys into current and projected and planned research—the work entailed here could perhaps be shared by several organizations, in view of the expanse, skill and time involved to execute such an operation. The organization of research and information-exchange seminars, often conducted via conferences and lectures, can be seen in some ways as but a forerunner to this.

Further, there is a need for 'producers' to ensure the earliest publication of talks and lectures delivered at meetings for the widest dissemination. Since speakers do not always write out their lectures, this calls for a greater use of tape-recorders and abstraction services, the onus of which may be placed either on the writer or the organization to which he speaks, depending on circumstances.

Journals are still not very standardized in their layout and there seems a need to look into this. For instance, the practice is increasing of having abstracts not only at the beginning or end of an article, but to make it possible to detach these to enable readers to tear them out and file them in standard filing card boxes. Also, if names of writers and their addresses and jobs were given in journals as a matter of routine it would make it easier for readers to get into direct touch with them if necessary.

III. *General needs*

Apart from the specific needs mentioned, it is convenient to consider some which are more general.

i. There seems to be a need for general co-operation among various criminologists and groups, and this perhaps could be done under the auspices of Aslib, which could arrange for meetings to discuss ways in which documentation services could best be shared between all. For instance, whether research survey information should be shared or whether it would be best to extend the use of the already excellent facilities provided by the (American) International Council for Crime in Delinquency which publishes annual volumes of on-going and planned research projects; whether *Excerpta Criminologica* could be helped more by closer co-operation and speedier work by individual abstractors and how these things might be stimulated. Coupled with this is the general question of central indexes and clearing-house functions and the storing and dissemination of information with the aid of computer machines, referred to by the co-speakers at this conference.

ii. As pointed out by P. Broadhurst, P. T. Brown and other writers on this subject there is, perhaps, an approaching need for extended use of the Current Contents Series of publications which comprises a weekly or fortnightly journal consisting only of reproductions in the original format of the content pages of many other journals (for instance, psychologists are mostly interested in the weekly Life Sciences edition, and the late fortnightly Social Sciences edition). In these, tearsheets are given, as are the authors' addresses, so that one can send off for off-prints. The difficulty about such services is that some journal reproductions are more relevant to one's work than are others, and this in turn may call for more 'personalized services'.

iii. Abstract Services, whilst admirable, have the danger of never being entirely up to date, in view of the inevitable time-lag between research, abstracting and publishing. Means of how best to speed up services might be worth considering. As Broadhurst points out, an interesting extension of an abstracting service, worth looking into, is for instance the one supplied by the 'Basic' service of Biological Abstracts, a computer-produced permuted-title index arranged by IBM's KWIC process (Keyword-in context). The results appear in a fortnightly journal in which the titles of all articles abstracted in *Biological Abstracts* are arranged so that each important word in each title is listed in turn alphabetically together with the number of the abstracts. Thus, to consult the abstract itself, one must refer to the standard edition of *Biological Abstracts*, which not many subscribe to but to which one can have access in major libraries.

iv. Further, there is a need to look into the field of book reviews. For instance, the mental health book review Index of the World Federation in Mental Health provides an excellent service (covering 230 journals) for workers in this field, which if properly used (if known by producers and consumers) is invaluable. However, time lags do exist and in order to obtain benefits in return, workers may have to co-operate with the WFMH Index Service to an increasing extent.

v. There may be a need to work towards a Citation index similar to that which has been used in the American legal profession since 1873. This is an arrangement of journal references which enables one to go from an earlier paper to all later ones that cite it as a reference (often produced either by a computer, or by a co-operative group of individuals covering the literature). Thus, this service provides information about the frequency and nature of the citation of individual articles and the impact an article has made, judged from the number of times it is cited by various journals and the kind of journals which have picked up the reference—thus indicating trends and coverage.

vi. There is a need to examine problems connected with the specialized training of staff in small as well as in large libraries. In general, whilst specialized librarians are possible in large libraries, this is rarely the case in small ones. The possibility of peripatetic part-time service to several small libraries may be worth considering.

vii. Diversification of journals. In the likely event of an increase of journals in this field, the desirability of occasional joint meetings between editors of various journals might be kept in mind with a view to occasional joint publications, or cross-references in editorials, etc.

viii. There is a need to gather information emanating from lectures given up and down the country and then to arrange for its speedy written dissemination throughout the country by means of journals, in abstract form at least.

ix. There is a need for adequate translation services in this rapidly expanding field. For instance, whilst it is relatively easy for most English speakers to inform themselves of progress reported in French, it is usually less easy to do so with communications written in German, Dutch, Italian, Spanish and Portuguese, with particular reference to publications emanating from South America.

x. There is a need to discuss possible extension of the services already provided by Aslib—information service, locating service, photocopying service, indexing service, register of translators, specialist librarians' conferences, research, training courses and the running of groups. For instance, co-operation among several individual compilers of Uniterm Cards (as described by P. Brown) could make a modest start of storing information from which machine storing might take over for universal retrieval services.

Finally, it may be useful to remember that, psychologically speaking, many of the aspects touched on are problems of communication which need solving not only in terms of material, but ultimately in terms of people whose smooth and swift interaction is constantly required. This calls for a closer relationship between consumers, producers and library staff, with less emphasis on the 'us' and 'they' attitude and more on task-orientated co-operation. Conferences of this kind might help to achieve something of this by sharing and initiating services.

There is no doubt that the brief outline of problems given in this paper has not exhausted the field by any means. It is hoped that these and other points will stimulate further discussion.

MECHANIZED METHODS OF DOCUMENTATION OF INTEREST TO CRIMINOLOGISTS

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IN this paper the main emphasis will be upon mechanized methods of documentation which work with a natural language input. These are systems in which the basic sources are read in to the machines in their pristine form, unindexed, unclassified and unabridged. The paper will first set out to correct some current misconceptions about mechanical methods. It will then consider the tasks which a modern digital computer can perform, and each will be examined in the context of documentation.

I. ATTITUDES TOWARDS MECHANIZED METHODS

Computers always arouse strong feelings. Iconoclasts welcome them as the harbingers of a new and better world. Conservatives fear them as the potential destroyers of all that has been built up so painstakingly over the centuries. In the area of documentation some see them as doing all the boring jobs, others just see them as doing *all* the jobs. These attitudes are unfortunate. They are also uninformed. In part they stem from a failure to understand the capacities of the machines, in part from a failure to understand the capacity of human beings for adaptation. The world in which computers will be commonplace will be very different from the world today. This failure of understanding is reflected in a pitifully misapplied terminology. It is natural to express judgments about mechanized systems in the same terms which are used of conventional systems. It is unfortunate not to appreciate their different connotation. This is as true of the eulogies of the optimists as of the diatribes of the pessimists. On the one side computers are inexhaustible and infallible; on the other, inflexible and expensive. It is worth taking a somewhat closer look at these terms.

When computers are said to be inflexible, it seems to be meant that once a system has been devised it cannot be modified. This is simply wrong. There are already computer systems in existence which can display internal information on cathode ray tubes during an operation, and which can respond to fresh instructions given with a light pencil. In a more pedestrian way, it is possible to arrange for the printing out of interim results so that changes can be introduced if necessary. The most fundamental error though is to ignore the infinite flexibility of programming techniques. One can usefully compare the flexibility of computer programmes which can be changed so quickly with conventional classification systems which, it seems, can hardly be changed at all. If there is a sense in which computers are inflexible, it is in their design. All current computers have been designed primarily for mathematical operations, and embody features which a linguistic operation can never use. It is always being said that a computer designed for linguistic work is just round the corner. Perhaps criminologists will help to swell the demand which alone will induce it to appear.

Computers are even more often said to be expensive. And in a sense they are. They cost a lot to buy. The transition to a computer system can be long and uneconomic. The running costs of particular programmes on a large computer may be disconcertingly high. But this is a one-sided view. It is not always necessary to buy one's own computer. Remote access to a large central computer is already established, and the hiring of time upon someone else's machine is positively commonplace. It is easy to arrange for programmes to be run simultaneously, and most large computers achieve this automatically in the interests of economy. Here too there is a tendency to ignore the costs of the conventional system. In the field of law one should consider not only the time of indexers and encyclopaedia compilers, but also that of clerks, solicitors, barristers and judges in any particular case. There is also the expense of correcting those decisions arrived at upon the basis of inaccurate or inadequate information. The real expenses of any system lie in the wasted time of ultimate users. It is not established how far, if at all, mechanized systems will improve upon conventional ones. It may be that time will be spent, less in looking for material which is relevant, than in rejecting material which is irrelevant. The librarian of the future may cease being an indexer and retriever, and become a scanner and rejecter.

Those who revere computers are more likely to speak of them as infallible and inexhaustible. Here too there is ambiguity and confusion. It is true that apart from mechanical failures, a computer can be made to follow a set of instructions exactly, indeed it can do nothing else. The fallibility of computer systems lies not so much with the computers, as with those who serve them. Because computers need programmes, and programmes need human authors, computers are not infallible. The range of possible error is great. Simple programming errors in particular sub-routines are relatively easy to detect. In fact the computer will usually indicate the error on a special print-out. Logical errors in the assembly of sub-routines can be more difficult to detect. Instead of indicating the error the computer happily produces a string of gibberish, or, even worse, something rather like what was expected. In one case it was found that where the computer was supposed to print out an alphabetical list, it always contrived to start with the last term, but apart from that produced a perfect list. It took some time to realize that this was due to the programmer having treated 1000 as a larger number than 1, an assumption which did not hold good in the system of arithmetic being used.

It is also true that a computer can work for twenty-four hours a day for very long periods. In fact, if this were otherwise, computers would not be economic propositions at all. But to suggest on such a basis that they are inexhaustible will bring a wry smile to the face of any programmer. A programmer's whole time is spent in devising the most economical use of storage space which is the computer's most precious commodity. It is a commodity in the shortest supply even on the largest computers. And information retrieval work tends to make the largest demands of all upon storage space.

If lack of understanding is partly manifested in misused terms, it is also partly manifested in over-generalization. Computers are not all exactly the same. Ask a salesman. Input media vary in suitability for different tasks. Much more important, all programmes are not equal. Their inequality is the most salient feature of any computer system. Any computer can be inflexible, expensive, fallible and exhaustible if the programming is bad enough. It often is bad, of course, but to blame the computer or mechanized methods is quite irrational. It is still more irrational to damn all computers on the same limited basis. The only rational course is to consider each task separately in the context of a particular set of programmes for a particular machine.

2. BASIC CAPABILITIES OF MODERN DIGITAL COMPUTERS

As has been explained, no computer has yet been designed for primarily linguistic operations. On the one hand this means that linguistic work, which for the most part uses only subtraction (to test for identity), and logical 'and' and 'or', makes no demand upon those facilities the inclusion of which makes computers as expensive as they are. On the other, it means that all words or letters have to be represented by numbers. And it is just as cumbrous for the modern programmer to represent letters as numbers, as it was for the Romans to represent numbers as letters. For example, it is necessary to take up six computer locations for every individual character if more than thirty-two different characters are to be used.

For convenience of exposition, computer operations, like Gaul, can be divided into three parts. Like those, these too are imprecise, and impinge upon each other.

i. Read-in and store (input)

Once data has been prepared in an acceptable medium it can be fed into the computer and stored. The data will consist as to part of working material, and as to part of programmes. In some computers there are facilities for storing many sets of data and programmes simultaneously, and matching them up later. Inside the computer the data has to be stored. There are many different types of store, each offering slightly different facilities. It is common for computers to incorporate more than one type of store. When they do, it is common to characterize them as fast or slow, depending upon the speed at which access to them can be made. In some types of store access can only be made to the information stored serially, in others the store can be entered at any point. The latter are said to permit random access.

ii. Manipulate

It is this facility which distinguishes computers from calculating machines. Logical operations such as conjunction and disjunction can also be carried out, and delaying devices allow instructions to be carried out in varying sequences. Programming is essentially the arranging of such sequences. In information retrieval the basic calculation is subtraction. In this way words in store are compared with words being read into the system to determine whether or not they are identical. The programme will then specify action to be taken by the computer in either event.

iii. Print-out (output)

This usually presents no special problems. It is obvious that computers must include some facility for presenting the results of their efforts. It is very common for there to be linked to the computer a high-speed printer. This will be able to produce an output in any desired form. The most usual for this sort of work is English text printed upon special paper. This has the same appearance as a message printed on a teleprinter. It can, however, equally easily be on paper or magnetic tape, on wire, or if ever required an aural version could no doubt be produced. If the print-out is itself to be used only as a subsequent input, it may well be sufficient to have it in a form which cannot be read as such by a human being. On some of the most modern machines it is also possible for results to be displayed on a cathode ray tube.

These three aspects will now be considered separately, and with special reference to information retrieval.

3. INPUT

i. Selection

One must remember that in any system what comes out must have gone in. Not necessarily in the same form, but somehow. At a very early stage in any project a crucial decision has to be made about the form of the input. In information retrieval one such decision is whether to index the material, or not. Indexing is taken to connote the representation of the content of a document by a relatively small number of words or phrases. The resolution of this problem will depend upon a number of factors. One must consider the total volume of material to be dealt with. If the volume is very large, it may, in an uncondensed form, outrun the storage capacity of the computer. On the other hand it may require so many indexers as to be prohibitively expensive. The homogeneity of individual documents must also be taken into account. In law, for example, it is certainly true that no one indexer can expect to cover any one case completely accurately and comprehensively. There is also a question as to the ease with which the subject content of individual documents can be recognized. Experiments in the legal field in the United States have revealed just how difficult a problem this can be. It is also important to consider how much flexibility is to be retained in the index terminology. If old terms are to be altered and new terms added with great frequency, then conventional indexing may be inappropriate. If conventional indexing is to be used, there are further problems in deciding the depth to be aimed at, and in ensuring consistency both of depth and representation. If conventional indexing is not to be used, some alternative method of reducing the bulk of the original material must be devised. There are two possible mechanical techniques, automatic abstracting and automatic indexing. Abstracting is taken to connote the representation of the content of a document by a relatively small number of sentences of conventional prose. An automatic index differs from a conventional index only in the fact that the words and phrases which represent the contents of the document are chosen by mechanical processes.

Many different approaches to automatic abstracting have been tried. None has succeeded. The basic technique is first to eliminate from the original text all those words which are regarded as being unrepresentative of its contents. Ways of doing this automatically are discussed in connection with automatic indexing. The second step is to select as representing the contents of the original document a number of sentences containing a given number, grouping or proportion of significant words. It is also possible to give artificial weighting to particular sentences such as those which begin or end paragraphs. There is here considerable scope for further research. The major difficulty is in selecting sentences which can be read together as a piece of continuous prose. There is also some difficulty in deciding exactly how many sentences are needed to represent a given document. There are many possibilities. An arbitrary number could be chosen, or it could be made proportionate to the length of the original, or it could be made to depend upon some criteria in terms of significant words. Despite the obvious difficulty of constructing a piece of continuous prose from extracts from another piece, it is worth carrying out further experiments. The advantage of mechanically constructed abstracts is that the significant words need not always be the same. Thus the same document could be automatically abstracted in many different ways depending upon the point of view.

The prospects for automatic indexing seem more promising and more immediate. The problem is to select automatically from the original document those words and phrases which best characterize its contents. In fact, the usual procedure is the converse of this. Instead of selecting words with a high information content, words with a low information content are eliminated. These words can be regarded as falling into two classes. One class comprises words which occur frequently in all documents such as articles, prepositions and auxiliary verbs. These are, by themselves, useless in information retrieval. It does not necessarily follow that they should therefore be discarded for all purposes. It might be necessary to restore the original text for printing out and in such a case they would be essential. Whether a word is of this type or not can either be determined intuitively, or by simple statistical methods. The other class comprises words which have a low information content in the context of one individual search. These are words which occur very generally in documents in one particular subject area, but not in others. In criminology the word 'offender' might fall into this class. These words are not completely useless. It is possible to exploit their characteristic of appearing in only one subject area. They can be used to identify that particular area in a collection of documents extending over a number of areas. The advantage of such a preliminary sifting lies in saving time and error. Time is saved because a relatively small number of words might identify an area relatively exactly. Error is saved because some high information content words may be ambiguous and appear in different areas with different meanings. Even if the words are not ambiguous it may be that the searcher is only interested in them in a particular context. Thus a criminologist may well be interested in one section of the literature on schoolboys, an educationalist in another. In a way this is a statistical analogue of a classification system. The crucial difference is that the words signifying the classes are selected not on a basis of meaning, but occurrence. Thus a word whose presence indicates a very general class may be quite particular in meaning. In an automatic system the only criterion for selecting such words is distribution in the texts. Exactly the same principles apply to final search terms, which are used to identify the documents retrieved among those in the subset selected by the methods described. These, too, can be selected on a basis of distribution within the subset. It may be possible to achieve substantial economies of operation by employing these methods. Not all subject areas will prove to be equally amenable to this approach. There is also scope for further research on the fixing of optimum area boundaries. There are, however, great attractions in this general approach. In particular it utilizes for indexing purposes just those techniques which are most helpful in promoting economy at the search stage. Unfortunately it has not yet definitely been established whether such a system of indexing can fulfil the user's needs as efficiently as one in which the terms are selected upon an intuitive basis.

Quite apart from this decision about indexing, another has to be made about standardization. This is a question not so much of whether to index, as of how to index. In conventional indexing a relatively small number of standard terms are generally used, supplemented by 'see also' references and classification schemes. Some standardization of terminology can be accomplished automatically. Let it be assumed that complete documents are to be used, shorn only of low information content words. It is obvious that different grammatical forms of high information content words will remain, and that, in the context of many searches, many of the words will be synonymous. Grammatical variations can be grouped together either by the specification of lists, or automatically. Lists could be specified completely intuitively, by reference to a dictionary, or by scanning a print-out of all the words processed by the computer. The advantage of the latter method is that it avoids searching for words which are not in the store; the disadvantage is that it means that for at least part of the input process grammatical variations are stored separately. There are also some completely automatic systems. It has been suggested that counting the number of terminal variant letters in two words may provide a clue. If, for example, after ten identical letters there are three more in one word, and one different one in another, then they could be regarded as the same word in different forms. It is clear that there are serious faults in any such method. It is unable to deal with short words, and is generally far too crude. More sophisticated systems compare lists of common roots and suffixes. This is more promising in theory. In practice it would hardly justify the enormous expense involved. A further disadvantage is that the integration of such a system with automatic spelling correction might be difficult.

Synonyms pose a more stimulating challenge. This is taken up later in the next section in connection with search strategies.

ii. Control

Once these decisions have been taken and the input selected, it becomes necessary to ensure that it is represented as accurately and appropriately as possible.

a. Accuracy. In an indexed system employing enormous teams of indexers, this is probably the most intractable problem of all. If the basic data is unindexed, accuracy remains just as important, but it becomes easier to check. Mistakes are most likely to occur in the process of transcription from the original data into a medium acceptable to the computer. The input medium has some influence upon the choice of checking procedure. For example, it is probably more economical to correct punched cards as they are prepared, whereas with paper tape, it is better to postpone correction until all the data has been prepared. Difficulties like these may soon disappear. The development of machines capable of automatic transcription from conventional sources to machine media is well advanced. Some think that this will make computer retrieval cheaper and easier. This may well be true. The effect may be even more fundamental. Once visual recognition of characters is established outside the computer, there is no reason to suppose that it is necessarily impossible to accomplish it inside. This might well mean that storage problems could be alleviated. It could also mean, since light must be the medium of recognition, that even more recent technological advances in this area, such as the development of industrial lasers, could be employed to revolutionize computer technology. This is still science fiction. A harder and more prosaic fact is that as type-setting by computer becomes even more widespread, so the stock of corrected computer assimilable versions of documents will multiply.

Some considerations militate against any preliminary checking for accuracy. It can be argued that spelling errors are unlikely to be important, and can be provided for as grammatical variations, or even corrected automatically. In fact automatic correction is still very much in the experimental stage, and depends upon a number of conditions which few systems could fulfil. There is also the apparently insoluble problem of the word which is mis-spelt to form a different word. Automatic systems of this sort are also impossibly expensive at present. The most serious objection, however, is that in unindexed systems correct punctuation becomes crucial, and can only be checked by conventional methods.

b. Appropriateness. This concerns not the accuracy but the organization of the text. In an indexed system the indexer has to choose the right terms, another highly intractable problem. If unindexed text is to be used, the problems are quite different. They largely concern settling and marking the definitions of the parts of the text. The first decision is as to the definition of a document. How it is made depends in part upon the material being used, and in part upon the capacities of the system. Thus books might be too long for the computer, and sentences too short for the user. Assuming that such a definition can be agreed, it must then be marked by an unambiguous symbol. It must be a symbol which does not appear in the text, and so far as possible one that no typist will be likely to insert in error. At the same time it should not be so complicated as to involve the computer in undue difficulty in recognizing it. In exactly the same way subsidiary definitions of sentences and words have to be devised, and signified. In these cases it is usually necessary to specify a number of alternative terminating signs. Unfortunately many of the most obvious choices are ineligible. Thus it is impossible to use a full stop to terminate a sentence since full stops also appear within sentences to signify abbreviations. It is probably most difficult to define words. There are obvious difficulties with such things as hyphenated words, numbers and dates. There are also complications where unique phrases and references need to be treated as a whole. It is often most convenient to regard these as single words. Further difficulties arise over the treatment of footnotes and parentheses. All these are exacerbated by the necessity, in order to plan storage economically, of specifying maximum lengths of each category in advance.

4. MANIPULATION

Even a simple input operation involves a considerable amount of manipulation. It would be quite uneconomic to feed information into a store willy-nilly, and only then to consider how to re-order it. The input routines must themselves arrange to store the data in the form most likely to lead to least subsequent processing.

i. Re-ordering

This operation basically changes the order of printing the information out from that in which it was read in. It includes a number of other operations as well, but this is the most obvious result. It can be used for a multitude of purposes.

a. Index rotation. Where a document is represented by more than one index term, the terms may be ordered, or unordered. In either case, it is sometimes useful to print them out in different orders. It is easy for the computer to print them out in any order. It is equally easy for it to preserve an order, but, for example, to alter the starting point. These techniques are particularly useful in the compilation of master indexes.

b. Listing. This is a very common requirement. Words can be listed in many different orders, of occurrence, alphabetically, frequency of occurrence or frequency of association with other words, to name only a few. Any of these could be useful in the context of a particular search. The last is especially valuable in connection with more sophisticated search strategies, and would not necessarily be printed out. Most of the others would normally be printed out, and serve to provide a fund of otherwise unobtainable information. Many retrieval experiments can be justified on this ground alone.

c. Concording. This is another basic technique of frequent application in information retrieval. Here the words of the original text have added to them a note of the positions in which they appear. In other words, a concordance is an automatically produced inverted file. Here, too, the value of such a procedure inside the computer is quite likely to be greater than that it should be printed out.

d. Up-dating. It is absolutely essential, where there is a likelihood of fresh data being added to the existing data in the course of the experiment, that procedures be available to add it in appropriately and economically. This sort of consideration can have an important bearing upon the storage structure employed. Thus it effectively rules out a simple alphabetic list. If such a list were used, it would mean that every time a new word was to be inserted, it would become necessary to move all words later in the alphabet down by one place. Each word would have to be moved individually, and where they were of different lengths this might involve considerable complication, and wasting of storage space. Fortunately more practicable methods have been devised.

ii. Searching

This is the key operation in information retrieval. It should not be thought, however, that all searches are alike. There are at least as many different types of search as there are types of need to be satisfied. Some may seek a precise piece of information, some a particular document, some will be content with any document on a given subject in a well-defined area, others will want all the documents on it, some will want documents over an ill-defined area in a bid to stimulate further thought, some will want to ensure that there are no documents on a given subject, others will not know exactly what they do want. Clearly no general strategy will satisfy all. The most one can assert, albeit somewhat vacuously, is that the overall aim is to retrieve as many relevant and as few irrelevant documents as possible. It has been suggested that these aims are fundamentally inconsistent, and that any increase in the number of relevant documents retrieved will be compensated for by a corresponding increase in the number of irrelevant ones. This may be too gloomy a view. Well devised and intelligently adapted search procedures may not be entirely impotent in this respect.

It is obvious that any search procedure must involve the rejection of some documents. If it did not, there would be no point in having a system at all. The precise method of determining which documents are to be rejected clearly depends upon the objects of the selection. Selection could be done on a random basis, for example in sampling. In information retrieval, however, the defining characteristic of the retrieved documents must bear some relationship to their information content. This may not be the only consideration. The user may also specify an absolute maximum number of documents to be retrieved. Thus one user might want only *the* most relevant document, another might want the most relevant 1 per cent, and another might want all those satisfying a given criterion of relevance.

There are many ways of satisfying these demands. In a classified and indexed system the levels of relevance are largely fixed in advance by the initial classification and indexing. In automatic methods using unindexed and unclassified material, flexibility is greater. The search procedure will generally assume that the information content of a document is reflected in the words which appear in the document. This may be disputed. So far, however, there is no evidence to disprove this assumption, and there is some to confirm it. The main difficulty is to ensure that the user makes adequate requests. In an indexed and classified system this difficulty is less acute. Indexes can, after some practice, be scanned by a user without serious difficulty. A list of words stored in a computer cannot. It might be thought that the user could be asked to specify his need in his ordinary language. This could then be processed in the same way as the material to be searched, and those documents containing the request terms retrieved. It would be difficult to devise a more inadequate approach. The user would specify only some grammatical forms of his search terms, and only some synonyms. To some extent these difficulties could be met by the use of devices to provide for grammatical variations, and by thesauri containing manually compiled lists of synonyms.

There is, however, a great scope for research to enable these functions to be performed automatically. Perhaps the most interesting work in the whole field of automatic information retrieval is being conducted in this area. There are two basic techniques. One is to expand automatically the terms specified by the searcher. The other is to expand the material retrieved on the basis of the original specification. The former relies upon word association, the latter upon document association. The current work is far too technical to be described in detail in this paper. Its basic assumption is that statistical methods of computing associations between words will enable words of similar meaning to be detected automatically. Thus in the first approach the words initially specified by the user have such similar words added to them before the search is conducted. The second approach has two stages. The user's terms are used to retrieve documents in the first stage. In the second stage, documents with similar concept patterns to the initially retrieved documents are found. The efficacy of these methods depends upon a number of factors. It depends in part upon the physical characteristics of the computer and the media used; in part upon the initial organization of the text, how documents, sentences and words are defined; in part upon the programming; and in part upon the choice of statistical formulae for calculating correlation and association.

Another interesting and related search technique employs not the words used in a document, nor index terms, but references made in a document to other documents. This approach is clearly restricted in the range of documents to which it applies, but for them it has interesting possibilities. One might note that manually compiled lists of this type have been used in connection with legal research in the area of case-law for centuries. The basic idea is capable of being applied in a number of different ways. Simple lists of works citing others, or of works in which those others are cited can be easily constructed. It is also possible to compute similarities of pattern and association between documents upon the same basis.

iii. Calculating

The most frequent calculation used in information retrieval is subtraction. If each character is represented by a number, a word is stored as a series of numbers. If a comparison needs to be made between a word stored in this way and a word being fed in, this can be accomplished by subtracting each number in turn. Thus the number representing the first character of the word fed in is subtracted from the number representing the first character of the stored word. If the answer is unity the character is the same, and the same process is applied to the next character. If all the answers are unity, then the words are the same. Hardly any other calculating facilities are used. The only qualification to this is that in the case of more sophisticated search techniques computers will be employed to calculate probabilities, distributions, correlations and associations. This will greatly increase the scale of the demands made upon such facilities.

5. OUTPUT

Here, too, the form of the print-out is determined by the use to which it is proposed that it should be put. Generally it will need to be in a transparent form, that is, one that can be read. If, however, the object is merely to use the output as material for fresh experimentation, then there may be no such necessity. In these circumstances, however, it might be unnecessary to have any output at all. There are also the possibilities of output in the form of a display upon a cathode ray tube, or an aural medium as has been mentioned.

One might legitimately infer that in information retrieval the output will normally be information. In fact this is rare. The most common form of output is of references to documents which, it is hoped, contain the information which the user requires. There is no insuperable theoretical objection to the printing out of complete texts of such documents. There are two major practical objections. The first is that where natural language is used as input, it will rarely be economic to store references to all the places where all the words appear. The list of references to 'and' would be far too long. Nor is it more economic to store the complete text in its original form separately. The second objection concerns the format of the output. At present this is most commonly one case script, like that produced by a teleprinter. It is also commonly printed upon continuous sheets of paper with no end margin. The ultimate result is that it is highly unpleasant to read. A possible means of overcoming these difficulties is to use micro-film in conjunction with the computer. One method, although probably unsatisfactory, would be to attach micro-film to the punched cards, so that retrieval of a title card automatically resulted in the retrieval of a micro-film copy of the document. This could then be enlarged, and passed on to the user. This, or something like it, might be worth doing in cases where copies of the original were hard to obtain. Generally, though, where there is no such difficulty, and where the user has easy access to original sources, a list of references is far more satisfactory.

Letters to the Editor

TITLES OF SCIENTIFIC PAPERS

Dear Sirs,

With reference to the letter to the editor of Dr P. S. Davison in *Aslib Proceedings* of December 1964, p. 383, about duplication of titles of scientific papers, I may draw your attention to the following.

Electronics and Power, formerly named *Journal of the Institution of Electrical Engineers,* gives in the September 1964 issue a short version of the paper of Mr Brailsford published in its original form in the *Proceedings of the Institution of Electrical Engineers* in the same month.

In my opinion it is no matter of duplication but of an announcement at the same time.

Yours faithfully,
J. H. DE WIJN

Netherlands Institute for Documentation and Filing,
45 Bezuidenhoutseweg,
The Hague,
Netherlands.
8th January 1965

DUPLICATION IN SCIENTIFIC PUBLICATIONS

Dear Madam,

I can give a partial answer to the question raised in Dr P. S. Davison's letter (*Aslib Proceedings,* vol. 16, no. 12, December 1964, p. 383) about frequency of duplication. We made a small *ad hoc* investigation of this three years ago. We took 'duplication' to mean same author, same title, and, as far as we could judge from a published abstract—we did not look at the original papers—the same article We did not count the publication of a paper in another language as duplication.

Using three English language abstracts journals which, as a matter of editorial policy included entries referring back to publications with the same author and title abstracted earlier, we found that between 0.4 per cent and 3.5 per cent of the papers were duplicates. In addition, we searched three comprehensive bibliographical surveys in narrow fields of applied science. These, taken together, yielded a duplication rate of 5.75 per cent. Data available as a by-product of another investigation suggested that the duplication rate for one form of duplication—publication of a paper in both a conference report and a periodical—was much higher, possibly as high as 30 per cent. Conference reports are seldom fully covered by abstracts journals so that in this respect the results of the first part of the investigation may have been too low. On the other hand conference reports are of course only a small proportion of the total literature.

By definition, these results refer to duplication of publication, not of research. Duplication of research is another matter. My colleague Martyn's recent report (*Literature searching by research scientists,* John Martyn, Aslib 1964) throws light on this. In his investigation 647 research scientists between them reported forty-three instances in their current projects of finding, too late, literature which revealed that their own research unintentionally duplicated other work.

Yours faithfully,

C. W. HANSON,
Head of Research

Aslib.
11*th January* 1965

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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MEMBERS' ADVERTISEMENTS

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WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. LABurnum 7723.

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BRITISH

TECHNOLOGY

INDEX

a subscriber's view

Sir Harold Roxbee Cox, *Chairman of the Metal Box Company Ltd.*, writes of his company's use of B.T.I.

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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 17 March 1965 Number 3

ASLIB CALENDAR 1965

March

TUE.23 – FRI.26.	Junior introductory course to special library and information work.
WED.24.	Economics Group annual general meeting and luncheon.
MON.29 – TUE.30.	Repeat course on work with patents.
WED.31.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Citation indexing', by John Martyn.
WED.31.	Engineering Group meeting, Golden Cross Inn, Coventry, 6 p.m. Discussion on sources of commercial information.

April

THUR.1 – SAT.3.	Aeronautical Group and Technical Translation Group joint conference at Cranfield.
WED.7.	Chemical Group annual general meeting.
WED.7.	Film Libraries Group annual general meeting, Shell.
MON.12 – TUE.13.	Course, 'Background to print'.
WED.14.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Communication', by E. A. Marsh. See paragraph below.
WED.14.	Scottish Branch visit to Colvilles Ltd, Motherwell. See paragraph below.
THUR.29 – SAT.1.	Northern Branch conference at Ilkley.
FRI.30 – SUN.2.	Midlands Branch conference, Cheltenham.

May

THUR.6.	Technical Translation Group meeting at Aslib, 3.30 p.m.
WED.12.	Electronics Group visit to IBM, Winchester.
WED.19.	All-day visit to NLL, Boston Spa. Details to be announced.
MON.24 – FRI.28.	Course on abstracting and co-ordinate indexing. See paragraph below.
WED.26.	Evening meeting at Aslib, 5 for 5.30 p.m.
SAT.29 – SUN.30.	Engineering Group conference, Leamington. See paragraph below.
MON.31.	Course on principles of information system design and planning. See paragraph below.

June

WED.9.	Annual General Meeting at Aslib, 12 noon.

July

FRI.9 – SUN.11.	Electronics Group 7th conference, Ashridge.

September

WED.29 – FRI.1.	39th Annual Conference at University of Keele. See paragraph below.

THE DIRECTOR

Leslie Wilson took up his appointment as Director of Aslib on 1st March 1950 and has thus completed fifteen years' service in this post. His understanding of Aslib's potentialities was shown with remarkable prescience in his paper to the 1950 Annual Conference entitled 'The future of Aslib' (*Aslib Proceedings*, vol. 2, no. 4, November 1950, p. 179–84). This, coupled with his qualities of leadership and administrative ability, has provided the outstanding personal factor responsible for Aslib's very considerable growth in membership, service, and influence for the national good during the past fifteen years. Aslib congratulates its Director on this anniversary, thanks him for his service and trusts that it will continue for very many years.

L. G. Patrick, *Chairman of Council*
J. R. Stocks, *Deputy Chairman*
D. T. Richnell, *Honorary Secretary*
A. H. Holloway, *Honorary Treasurer*

Aslib 39th Annual Conference

Members will wish to note that the 39th Conference will be held at the University of Keele, North Staffordshire, beginning at lunchtime on Wednesday 29th September 1965 and finishing in the afternoon of Friday 1st October (with an option of stay until Saturday breakfast, to attend informal discussion groups on Friday evening).

The programme, with application forms, is being distributed with this issue of *Aslib Proceedings*.

Aslib Evening Meeting

'Communication' is the theme of the lecture on Wednesday 14th April by Mr E. A. Marsh, Group Training Officer at the Reed Paper Group, Maidstone. In the administration of an information service or special library the prime objectives are to communicate information to inquirers and to receive information from them about their particular problems. The purpose of this meeting is to consider some of the basic problems of communication met with in the overall field of industrial operations.

The chair will be taken by Mr C. E. C. Hewetson, Information Officer of H. J. Heinz Co. Ltd. The lecture will be illustrated by an outstanding short film—*More than words*—which, by cartoon and case study, illustrates how fundamental is the need to improve communication between people and between groups. The usual discussion period will follow the lecture and film.

Members wishing to attend the meeting are asked to apply to Aslib, 3 Belgrave Square, London SW1, not later than 7th April. The lecture will begin at 5.30 p.m. (tea being served at 5 o'clock). The meeting will be held at 3 Belgrave Square.

Aslib Courses

Aslib is once again presenting the course on abstracting and co-ordinate indexing which was developed for the Engineers' Joint Council in America by the Battelle Memorial Institute. The purpose of the course is to create the highest possible efficiency in the utilization of literature by abstracting and co-ordinate indexing according to a system that does not require the use of complicated equipment. Individual research workers, as well as large organizations with well developed information services, can derive great profit from the method. The course includes a large percentage of practical work in addition to lectures. A training manual and other documents are supplied and no additional reading or preparation is required. The course will be held from Monday 24th to Friday 28th May 1965 at the Royal Commonwealth Society, 18 Northumberland Avenue, London WC2. As on previous occasions the lecturer will be Mr John C. Costello, Jr, Director of the Information Systems Research Group, Battelle Memorial Institute. All students must have had either a formal education up to degree standard or else considerable experience in either scientific and technical work or a special library or information department. The fee for the course will be 50 guineas. A full programme of the course is enclosed in this issue, and applications should be made on the form enclosed in it. Applications *must* reach Aslib by 23rd April.

Since this course was originally presented, Mr Costello has developed a number of more specialized sessions to supplement the material given in the main course. Two of these were offered to students who had already attended the main course when Mr Costello last visited London in December. He has now prepared a further session on the Principles of Information System Design and Planning. This gives a detailed analysis of the component functions and services possible in an information system to enable registrants to evaluate alternatives and select those most effective and productive within the economic limitations of their own environments. This will be held at Aslib on Monday 31st May 1965. The fee will be 9 guineas. Students must be of the same level of education or experience as for the main course. A descriptive leaflet with application form is enclosed in this issue and applications must reach Aslib by 23rd April.

Scottish Branch

Arrangements have been made for Branch members and friends to visit Messrs Colvilles Ltd, Ravenscraig Works, Motherwell, on the afternoon of Wednesday 14th April, at 2.15 p.m. Numbers will be limited and coach transport to take the party has to be pre-arranged. Full details have been circulated to Scottish Branch members but anyone else interested in accompanying the party should get in touch with the Branch Honorary Secretary, Mr W. H. Rutherford, Royal Society of Edinburgh, 22 and 24 George Street, Edinburgh 2, without delay.

Engineering Group

The Annual Conference is being held once again at the Manor House Hotel, Leamington Spa, starting with coffee at 11 a.m. on Saturday 29th May and ending after tea on Sunday afternoon, the 30th. Under the general theme 'Control of machines' a wide range of subjects will be presented, among them papers on analogue control techniques, hydraulics, pneumatics, numerical control and a general paper on the literature of control engineering.

The fee for the conference will be £6 5*s*. Further information and application forms will be sent direct to Group members during the early part of April; full details will also be published in the April *Aslib Proceedings*. Information will also be sent direct if requested by writing to the Group Secretary, Mr D. P. Woodworth, 80 Fetter Lane, London EC4.

Mr W. H. Higginbotham

We very much regret to have to report the death of Mr W. H. Higginbotham, F.S.A.A., who was chairman of Edgar Allen and Company Limited, the well-known Sheffield steelmakers. Mr Higginbotham was a Vice-President of Aslib from 1952 to 1955 and took a great personal interest in its affairs for many years. Northern Branch members in particular will remember the active part which he often played in branch meetings, as well as the generous hospitality which he extended on a number of occasions.

World Calendar of Forthcoming Meetings: Metallurgical and Related Fields

The Iron and Steel Institute is publishing a new list of forthcoming meetings in metallurgical fields. To appear in six cumulative issues a year, beginning with February–March 1965, the list will cover a period of about two years, and will cover meetings anywhere in the world concerned with 'ferrous and non-ferrous metallurgy, production, working properties of metals, their related engineering and other technologies, and services'.

Besides the usual details, the fees, languages to be used, and arrangements for preprints or proceedings volumes are to be given. Entries will be in chronological order, and each issue will contain indexes to title, place and organizing body.

The subscription rate is 5 guineas a year including surface postage. Orders for the calendar or information for inclusion in it should be sent to The Iron and Steel Institute (World Calendar of Forthcoming Meetings), 4 Grosvenor Gardens, London SW1, from whom further information can be obtained.

Cumulative Indexes to *Science Abstracts* for 1960–64

Following the prompt publication of the 1964 Annual Subject and Author Index to both *Physics Abstracts* and *Electrical Engineering Abstracts*, a start has now been made on the production of the 1960–64 Cumulative Index to *Science Abstracts*. The Author Index to Section A, *Physics Abstracts*, is currently being prepared and it is hoped to publish it in May 1965. This index will contain some 240,000 entries in 2,300 pages and will be bound in four parts, each finished in stiff covers and buckram cloth. The price of the Author Index is £17 (to members of the sponsoring societies, £10). The Subject Index to *Physics Abstracts* and both the Author and Subject Indexes to *Electrical*

Engineering Abstracts will be published later this year. Orders and inquiries should be sent to the Secretary, The Institution of Electrical Engineers, Savoy Place, London WC2.

Mobile Shelving

Members who have no experience of Compactus mobile shelving will be very welcome to see an example at Aslib. Messrs J. Glover & Sons presented us with an electrically driven set of this shelving just over a year ago and it provides Aslib library with valuable storage space for some of its older stock. Many of our visitors have been impressed by the ease with which the shelves move along their rails. The library staff will be pleased to demonstrate this equipment to others who are interested.

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THE WORK OF THE HAMBURG INSTITUTE FOR INTERNATIONAL ECONOMICS

WOLFGANG MICHALSKI

Chief Research Assistant, Hamburgisches Welt-Wirtschafts-Archiv

Evening meeting, London, 6th November 1964

THE Hamburg Institute for International Economics* is one of five large institutes in the Federal Republic of Germany engaged in economic research independent of the relevant activities of universities as well as other research organizations in government, trade and industry. Being a scientific institute of the Free and Hanseatic Town of Hamburg it is controlled by the University Department of the Hamburg schoolboard. The Director of the Institute is Professor Dr Heinz-Dietrich Ortlieb. The staff numbers 120 members, including thirty departmental heads and scientific specialists.

The Institute is a member of the Association d'Instituts Européens de Conjoncture Economique; it is also a member of the Association of German Economic Research Institutions (Arbeitsgemeinschaft Deutscher Wirtschaftswissenschaftlicher Forschungsinstitute e.V.). Within the latter, which, apart from the five big institutes, comprises a large number of smaller and, in some cases, specialized ones, the Hamburg Institute with its research programme and its publications is the institute with the most pronounced orientation towards the requirements of economic policy, on the one hand, and of trade and industry, on the other. This applies both to empirical basic research and methodological research—for which the subjects under investigation are selected by the Institute on its own initiative—and also to research work which is carried out for individual business enterprises at home and abroad, for trade associations, authorities, and national as well as international institutions on a fee basis. At times this latter work represents a substantial part of the whole of the Institute's work, especially within the province of the third important function of the Institute, namely its documentation and information service.

In the early nineteen-fifties attention was already focused in the Institute's research work on the problems of development aid and the emerging countries. Since then it has carried out numerous investigations which, in their choice of topics and their special characteristic of modelbuilding, underline the Institute's orientation towards assisting the policy-shaping decisions of public utilities and individual firms. The following examples taken from studies already published or in preparation serve to illustrate this. The research programme started with a three-volume Encyclopaedia of Countries (*Länderlexikon*) containing data on the political and socio-economic structure and development of all the countries in the world. The usefulness of the lexicon led to the publication of other studies of various countries with emphasis on their special problems, in order to provide more comprehensive knowledge. Examples are:

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* Hamburgisches Welt-Wirtschafts-Archiv.

1. 'Mexico, a way to economic development between state planning and private initiative.'
2. 'The limits of economic aid in attaining success in the process of development, based on the example offered by Greece.'
3. 'Co-operation in Africa—a case-study based on the co-operation of the states of the former French Equatorial Africa and the Cameroons.'

Other works enabled a profounder investigation into the problems of development aid, while some investigations—based more on economic history—gave illustrations of development processes already completed. Examples are:

1. 'Independent technological guidance—its importance for the opening-up of under-developed territories.'
2. 'Soviet Bloc foreign aid to the under-developed countries.'
3. 'Mobilization of manpower potential in Asia and Africa.'
4. 'The reform of development aid.'
5. 'Industrial investment in development countries.'

and last but not least

6. 'Turkey—approach to modern development under Kemal Ataturk.'
7. 'Japan's progress from a feudal state to a modern industrial state.'

As the latest stage of investigations carried out on models pertaining to this particular field, the Hamburg Institute for International Economics has concentrated its activities on factual problems, especially on the possibilities and problems of regional integration in Central and Latin America, in Africa and South-East Asia, and also on factors of regional significance, such as

1. 'The rise of Latin America.'
2. 'Marketing possibilities for Brazilian coffee in the Federal Republic of Germany.'
3. 'Intracontinental communications in Latin America—the present position, future demand and development potentials.'

A further example of research undertaken on the Institute's own initiative is offered by its investigations in the field of marketing. These deal with basic problems of marketing, methodological problems as well as empirical research into various aspects of marketing. The results of these investigations appear as single publications, or, as regular contributions, in the Economic Review (*Wirtschaftsdienst*), the Institute's monthly periodical, of which an English edition is also published. Finally, to give a last example of initiative research on the part of the Institute—regular investigations are devoted to the development of business cycles in the world. Their results are published in the quarterly Information on International Business Trends (*Weltkonjunkturdienst*) and in the fortnightly Tomorrow's Business Trends (*Konjunktur von Morgen*).

The Institute's research work on a fee basis is not restricted to certain topics only, but in the main only those research orders are accepted whose execution, regarding method and topic, is also of interest within the Institute's general work. These investigations are mainly concerned with demand and marketing prospects for industry and commerce (for instance sales opportunities for German steel for shipbuilding). There are also investigations into the structure of various branches of the economy, basic studies on economic policy, export reports as preliminary reports to studies on planning in development countries, regional investigations, or monographs on specific countries. Examples are:

1. 'Recommendations on the promotion of export products (additional to Babaçú and Ramie) in north and north-east Brazil, with special attention to the world market situation.'
2. 'Recommendations on the promotion of small and medium industries in north and north-east Brazil by regions and products.'
3. 'Co-ordination of suggested projects with economic planning in Brazil (especially Sudene) and with development projects of other donator countries.'
4. 'Suggestions for further projects to be promoted through development aid by the Federal Republic of Germany.'

The documentation and information service of the Hamburg Institute gives individual enterprises, trade associations, authorities, institutions, and other bodies concerned with the economy or engaged in it, help and advice in the promotion and intensification of their business relations at home and abroad, and in the procurement of information in so far as the latter is obtainable from the evaluation of available relevant literature. The systematic and regular study and evaluation of literature and statistics is pursued by a special method on behalf of interested clients, so that regular and comprehensive data are available. A monthly publication, Bibliography of Articles in Foreign Periodicals (*Bibliographie der Wirtschaftspresse*), quotes and reviews articles from roughly 2,500 foreign periodicals in specific economic fields.

Thus the work of the Hamburg Institute for International Economics covers a wide range of activities—namely documentation and the study of pertinent literature, the provision of comprehensive and well-qualified information, the compilation of reports on markets and business trends, the writing of monographs, and basic investigations in the field of economics. For this work good sources of information are essential, and the Institute's Library and Archives rank among the biggest and most important specialized institutions of this kind in the Federal Republic of Germany. Their shelves are accessible to everybody.

Although mainly collecting literature from all economic fields and bordering areas—technology, politics, law—the Library also offers literature from other disciplines, for example geology, geography, ethnology. It is clearly orientated towards world economy so that it houses literature from and on all the different countries. The books (about 450,000 volumes) comprise address books, codes, ordinary dictionaries, encyclopaedias, atlases, and some 200,000 business reports and records issued by business firms to commemorate anniversaries; furthermore, national, supranational and technical statistics, special literature on countries and commodities for all branches of the economy, special literature on enterprises, economic organizations, authorities, institutes, and prominent personalities, collections of laws passed, national and technical bibliographies, press catalogues, official printed matter, catalogues of fairs and, finally, specific literature on the different parts of economics. Every year about 20,000 new volumes are added to the Library. In addition there are about 3,500 short-term periodicals of which 2,400 are foreign periodicals; these include economic and technological periodicals, daily newspapers, news and press services from all countries in the world. There are about 7,000 annuals of which 5,700 are of foreign origin. The Library of the Hamburg Institute for International Economics is a Depository Library of the United Nations and the European Communities.

The Archives house some nine million press clippings; about 250,000 clippings are added every year chiefly from economic and daily newspapers, from the news and press services, as well as from some journals. The 'Countries' archives contain information on 280 countries and territories with 1,500 sub-divisions according to the relevant material; in the 'Commodities' archives there is information on 10,000 commodities, in the 'Persons' archives on 38,000 eminent persons, and in the 'Firms' archives on 49,000 firms.

The organizational structure of the Institute is as follows. The Institute is divided into three central departments:

Central Department I, Management and Administration
Central Department II, Research
Central Department III, Documentation, Library, Archives.

Central Departments I and III are subdivided into the departments indicated. Central Department II, however, comprises the following five departments:

1. Department for Fundamental Research
2. Transport and Public Finance
3. Foreign Trade and Industrial Marketing
4. Development Policy
5. Business Trends and International Monetary Policy.

The Department for Fundamental Research deals on the one hand with basic research, on the other with co-ordinating the work of the other research departments in the fields indicated.

Export surveys, investigations and research covering more than one specific field are done in team work by several research divisions. The scientific work is carried out by the methods best suited to the problem under consideration. The techniques applied comprise, above all, methods of quantitative research: for the investigation of models, for the drafting and analysis of economic programmes, for the study of problems of decision, and for the investigation of the effects of the individual factors on the economy. Where, especially, large-scale basic research is concerned, the Institute attaches special value to on-the-spot investigations of the problems involved, linked with interviews. This, of course, necessitates frequent travelling in foreign countries.

AUTHOR'S SUMMARY OF DISCUSSION

In reply to questions asked in the discussion following his paper, Dr Michalski made the following comments.

The Institute had no overseas representatives, he said, but its staff were frequently sent to other countries on special missions.

Asked about the historical background of the Institute, Dr Michalski said that the Library originally belonged to the Central Colonial Research Institute (Zentralstelle des Hamburgischen Kolonialinstituts), founded in 1908. In 1919 the teaching functions of this Institute had been taken over by Hamburg University, and the library and archives had remained an independent Institute. The present constitution had arisen out of the situation at the end of World War II, when research functions were being added and rapidly expanded as an instrument of national recovery, and it had been found then that the library and the research departments were able to help one another. The library had luckily been able to preserve most of its stocks during the second world war; some of them, however, were later lost in the great flood of 1962.

He added that the Library has exchange relations with many institutes and libraries in other countries, for example the British Library of Political and Economic Science, the Royal Institute of International Affairs, and the National Institute of Economic and Social Research. The number of organizations with which it co-operates in Britain alone is over forty.

The staffing of Central Department III (Documentation, Library and Archives) was outlined by Dr Michalski. The Heads of all three departments were qualified economists. In the Documentation and Information Department there were four economists, and the rest were linguists with knowledge of English, French and at least one other language beside German. In the Archives Department there was one graduate; all other staff were of lower grades. The Library had economists as heads of the cataloguing and acquisition sections, with qualified librarians working under them.

Letters to the Editor

DISSEMINATION OF INFORMATION TO A MAJOR STEEL GROUP

Dear Madam,

Aslib Proceedings, January 1965

I should like to make the following comment on the excellent paper by Mr Hindson, which was full of information and useful advice:

We, in The United Steel Companies Limited, began to evolve our scheme for keeping research and production management informed of developments in their own and allied fields as long ago as 1948. This has now developed into a system involving the selection of potentially useful information which is beamed every day at specific targets in the form of committees, specialist groups and individuals. Contact is maintained with all three categories sometimes on a personal basis, by noting various inquiries and by digesting the minutes of scientific and technical committees which are received regularly—a method which, I think, Mr Hindson does not mention and which could perhaps be a useful addition to his already good feed-back system.

I greatly admire Mr Hindson's successful efforts to persuade his management and specialists to answer the questions on his information circulars, as this is obviously the best way to evaluate their usefulness to the people concerned. On the other hand, I was rather puzzled as to why different colours are used to differentiate between information circulars emanating from different sources as mentioned on page 13 of the paper.

Yours faithfully,
R. SEWELL,
Information Officer

The United Steel Companies Limited,
Research and Development Department,
Swinden Laboratories,
Moorgate, Rotherham.
2nd February 1965

TITLES OF SCIENTIFIC PAPERS

Dear Madam,

Duplication of Research

I am grateful to F. H. Smith for his reply in *Aslib Proceedings* for January 1965 to my letter on the duplication of reports of research. His second paragraph, however, surprises me: I should have thought one of the important aims of documentation—both in the form of early notifications and letters to journals, and of Current Awareness and similar services—was to enable scientists to avoid duplicating research done by others.

In an attempt to further the avoidance of wasteful and costly duplication of research, and to promote co-operation between scientists, the Centre is studying the possibility of the inclusion of notifications of current research work in universities and technical colleges in its Current Awareness Services. We should be very glad of the views of your correspondent and others on this topic to expand the questionnaire survey of the users of the service which the Centre is conducting.

Yours faithfully,
P. S. DAVISON

Scientific Documentation Centre Ltd,
Halbeath House,
Dunfermline,
Fife.
5th February 1965

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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MEMBERS' ADVERTISEMENTS

The charge for advertisements in these columns is 4*d* per word, minimum 5*s*. An additional charge of 6*d* is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 6 Lakeside, Ealing, London W13. ALPerton 1045.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. LABurnum 7723.

TRANSLATOR OF SCANDINAVIAN LANGUAGES, ten years' experience. Member of Translators' Guild. J. T. Craddock, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

TRANSLATIONS from French, German, Spanish and Italian into English. Full-time service. Elec. Engng., Electronics, Communication, Radar, Control, Physics, etc. Member ASLIB Register. W. G. STRIPP, A.M.I.E.E., Alexandra Hotel, Esplanade, Weymouth. Phone 767.

Appointments vacant

ASSISTANT INFORMATION OFFICER. A woman graduate is required, preferably with a degree in science and/or experience in technical information work. Ability to read German would be an advantage. The work is varied and will include abstracting, indexing, answering inquiries, literature searches, etc. Salary scales: £860–£1,035: £1,015–£1,520. Superannuation scheme. Please apply in writing to The Director, British Paper & Board Industry Research Association, Welcomes Road, Kenley, Surrey, quoting ref: MYG.

ASSISTANT TECHNICAL INFORMATION OFFICER. Applications are invited from civil engineering graduates and/or qualified civil engineers, who are keen to work in the field of scientific information. Applicant's duties will include answering scientific and technical inquiries, carrying out investigations and writing reports on diverse subjects connected with the building and civil engineering industry, reviewing and evaluating patents and helping in the running of an information retrieval and dissemination system. Knowledge of scientific German and/or French would be an advantage. Please write or phone E. Boyd, Staff Appointments Officer, Taylor Woodrow Construction Ltd, 345 Ruislip Road, Southall, Middx. WAXlow 2366.

THE BRITISH SHIP RESEARCH ASSOCIATION requires a Library Assistant to work in its busy Technical Library. One or two years' library experience, preferably in a technical library, desirable. Typing an advantage. Good salary, five-day week, pleasant working conditions. Applications giving particulars of age, education and experience should be addressed to the Administrative Director, B.S.R.A., Prince Consort House, 27–29 Albert Embankment, London SE1.

G.E.C. (ELECTRONICS) LTD, APPLIED ELECTRONICS LABORATORIES, STANMORE, MIDDLESEX. A vacancy exists for a LIBRARIAN. Applicants should be Chartered Librarians. Experience in special library techniques, in particular indexing and abstracting, and/or a knowledge of the subject of electronics would be an advantage. The successful applicant will be concerned with the day-to-day running and routines of a technical library, cataloguing and classification using U.D.C., and assistance to readers. Salary scale is according to age and qualifications. Apply in writing to the Staff Manager giving details of age, qualifications and experience.

OVE ARUP & PARTNERS, who are Consulting Structural & Civil Engineers, require for their Library two assistants, one to deal entirely with a large and increasing collection of photographs and slides, and the other to deal with the cataloguing and classification of technical information. Experience is obviously desirable in the field of building, civil engineering and architecture, but is not imperative, ability is much more important. Please write, giving details of age, experience, qualifications and salary required, to: Ove Arup & Partners, 13 Fitzroy Street, London W1.

UNIVERSITY OF SOUTHAMPTON. Applications are invited for the post of Assistant Librarian from 1st October 1965. Candidates should possess an honours degree and a post-graduate diploma in librarianship, or a professional qualification, and have had previous library experience. Candidates with a degree in Science or the Social Sciences will receive special consideration. Salary scale £1,050–£1,995, starting point according to qualifications and experience. F.S.S.U. benefits. Applications (six copies) giving the names of two referees and full personal details should be sent, before 27th March, 1965, to the Deputy Secretary, The University, Southampton, from whom further particulars may be obtained.

EXPERIENCED INFORMATION OFFICER required by Martech Consultants Ltd. Graduate, familiar with business information sources, indexing, literature searching and small library control; able to meet varied daily requests while training assistants and maintaining flow of management information. Salary by negotiation. Previous candidates may reapply. Contact Mr Greenwood, MAY 7630, for details.

LIBRARIAN required by IBM UNITED KINGDOM LIMITED to control and develop its library and technical literature service, which is expanding in response to a rapidly increasing demand from their highly qualified technical personnel.

The library's subject field is data processing and its application in industry, commerce, science and the humanities. During 1965 catalogue production and library routines will be mechanized. If you are a male graduate chartered librarian, aged up to 35, with an interest in data processing, we shall be pleased to hear from you.

No previous knowledge of data processing is needed as all necessary training will be given to the successful candidate.

The initial starting salary will be up to £1,850 p.a., depending on your experience of library administration and cataloguing techniques suited to mechanized systems.

Please write stating age, education and previous experience to the Manager of Personnel Selection, 101 Wigmore Street, W1, quoting reference GA/AP/96.

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Wanted

SOCIETY OF PLASTICS ENGINEERS JOURNAL, Vol. 13, February 1957. Librarian, Shell Chemical Company, Carrington Works, Urmston, Manchester.

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LIBRARIAN

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ICI

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Requests for application forms should be addressed to:

Mr P. W. Ellington,
Personnel Officer,
Imperial Chemical Industries Limited,
Heavy Organic Chemicals Division,
Accounts Block,
Wilton Works,
near Middlesbrough,
quoting Reference No. 770.

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Further particulars may be obtained from the **Secretary of the University, Bailrigg House, Lancaster,** *who should receive applications (two copies), together with the names of three referees, not later than* 12*th April,* 1965.

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From time to time other articles of interest are included. Recent examples are articles on the Science Museum Library, by J. A. Chaldecott, and the libraries of British Nylon Spinners, by Wilfred Ashworth. Specimen copies are available on request.

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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 17 April 1965 Number 4

ASLIB CALENDAR 1965

April

THUR.29 – SAT.1.	Northern Branch conference at Ilkley.
FRI.30 – SUN.2.	Midlands Branch conference, Cheltenham.

May

THUR.6.	Technical Translation Group meeting at Aslib, 3.30 p.m.
WED.12.	Electronics Group visit to IBM, Winchester.
WED.19.	All-day visit to NLL, Boston Spa. See paragraph below.
WED.19.	Scottish Branch meeting, Glasgow, 7 p.m. 'Happiness is a smart librarian', by W. Ashworth. See paragraph below.
MON.24 – FRI.28.	Course on abstracting and co-ordinate indexing.
WED.26.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Micro, micro . . .', by L. L. Ardern. See paragraph below.
SAT.29 – SUN.30.	Engineering Group conference, Leamington. See paragraph below.
MON.31.	Course on principles of information system design and planning.

June

WED.9.	Annual General Meeting at Aslib, 12 noon.
MON.14.	One-day conference on current awareness. See paragraph below.

July

FRI.9–SUN 11.	Electronics Group 7th conference, Ashridge. See paragraph below.

September

WED.29 – FRI.1.	39th Annual Conference at University of Keele.

Current Awareness

This is the theme of an Aslib one-day conference to be held on Monday 14th June at the Piccadilly Hotel, Piccadilly Circus, London W1.

The speakers will talk about present and future techniques which are, or may be, used by information services for keeping their users up to date—and beyond! Mr John R. Sharp of ICI Fibres Ltd will take the chair, and the speakers will be Dr R. T. Bottle of Bradford Institute of Technology, Mr T. M. Aitchison of the National Electronics Research Council, and Mr D. E. Bagley of the English Electric Co. Ltd, Group Central Library.

Further details and application forms will be ready for distribution with this issue, or, shortly, available on request from the Meetings Organizer, Aslib, 3 Belgrave Square, London SW1. The charge will be 45*s* a head, including conference fee, morning coffee and luncheon.

Visit to NLL: Reminder

Arrangements have now been made for the all-day visit to the National Lending Library for Science and Technology at Boston Spa, on 19th May. Application forms were distributed with the March issue of *Aslib Proceedings*

Evening Meeting

At the meeting on Wednesday 26th May, Mr L. L. Ardern, Librarian, Scottish College of Commerce (University of Strathclyde) will take for his title 'Micro, micro . . .'. He will, to cite his own words, take a quick look backwards; make a few points about today's techniques; and spend a longer time considering the implications of the microrecording methods with which we are threatened in the foreseeable future.

The Chairman will be Mr R. G. Griffin, Librarian, The Chemical Society. The meeting will be held at 3 Belgrave Square at 5.30 p.m. and tea will be at 5 o'clock.

Scottish Branch

It was suggested to the Branch Committee that members would welcome an opportunity of hearing an address by Mr Wilfred Ashworth, Librarian, ICI Fibres (formerly British Nylon Spinners) Ltd, whose paper at the Aslib Annual Conference at Exeter, 1964, was received with acclamation.

The Conference report stated (in *Aslib Proceedings,* December 1964):

> 'One [session] which will long be remembered by all for its outstanding quality was that by Mr Wilfred Ashworth of British Nylon Spinners Ltd, which was described in the programme as "*The rare ones,* a slide session in which the author makes a pilgrimage in search of ingenuity in libraries and returns with some curiosities wherewith to regale his hearers. It will be a paper which brings together many 'diversities'." It did, and he did It was a masterly presentation, scholarly and witty, supported by a long series of fascinating slides, prepared by the author for the occasion and gathered over a long period. It certainly deserved the ovation of applause at its close.'

Branch members are asked to note that arrangements have been made and

Mr Ashworth has generously agreed to speak on Wednesday 19th May, on 'Happiness is a smart librarian'. The title of his paper has been altered especially for this occasion and branch members are earnestly requested to give the meeting their wholehearted support and to bring along as many interested friends and colleagues as possible. The meeting will be held at the University of Strathclyde, George Street, Glasgow, at 7 p.m.

Aslib Co-ordinate Indexing Group

Aslib Council has agreed to a proposal to form a Co-ordinate Indexing Group and a Steering Committee has now been set up. The Chairman of the Committee is Dr W. E. Batten and the members are Mr T. M. Aitchison, Mr G. M. Boyd, Mr D. R. Curry, Mr H. F. Dammers, Mr R. Snel and Mr R. C. Wright. The Group will work in close touch with Aslib Research Department. Its objectives will be to widen present knowledge of, and explore current problems in, co-ordinate indexing; it will seek to achieve these objectives by (among other things):

a. Elucidating basic principles: for example, studying the possible compatibility and structure of thesauri;

b. Compiling a register of members (showing size and type of organization, etc.) to ensure that the best person may be consulted when others are considering establishing a system;

c. Promoting investigation, initially by preparing a list of terms used in the art of co-ordinate indexing, with a view to using these terms to compile a thesaurus;

d. Providing a forum for the exchange of experience between members interested in co-ordinate indexing.

Members who are sympathetic to the above objectives and who feel that they have some knowledge and/or experience which would be useful to the Group are invited to write to Mr A. D. B. Gilchrist, Research Department, Aslib.

Electronics Group Seventh Annual Conference

The Annual Conference will take place once again at Ashridge Management College, Berkhamsted, from 9th to 11th July. It will open on the Friday evening in a lighter vein, with a paper on local history. On Saturday there will be two papers on management and information services. The technical lectures this year will be on radio astronomy and communication satellites, given respectively by speakers from Jodrell Bank and the General Post Office. The closing paper is on the National Electronics Research Council; and the Annual General Meeting will be held on Saturday 10th July at 2 o'clock.

The full programme is expected to be ready in May and copies will be sent to all group members. Anyone requiring further information should get in touch with Mr R. S. Lawrie, Chief Librarian, Sperry Gyroscope Company Ltd., Downshire Way, Bracknell, Berkshire.

The cost, including accommodation and conference fees, will be £8 a person. Because of building operations and a shortage of accommodation at the College this year, it will be necessary for some delegates to share a bedroom and others to be housed at a local hotel (The Bridgwater Arms in Little Gaddesden, just outside Ashridge Park). Those in the hotel will only be there for bed and breakfast, all other meals being taken in college.

Engineering Group

The annual conference of the Group is being held again at the Manor House Hotel, Leamington Spa; it will begin at 11 a.m. on Saturday 29th May and end about 4 p.m. on Sunday 30th May. The inclusive charge is £6 5*s*.

This year's theme is 'Control of machines' and the following papers will be presented: 'Anologue control techniques', by E. A. Mamnoon (English Electric Co.); 'Hydraulics', by A. E. Bingham (Dowty Rotol); 'Pneumatics', by J. E. Graham (Martonair); 'Application of digital techniques to the control of electrical machinery', by C. F. J. Fennell (AEI); 'Numerical control', by J. O. Cookson (MTIRA); 'Literature on control engineering', by L. Taylor (Ferranti).

Application forms may be obtained from the Group Secretary, Mr D. P. Woodworth, 80 Fetter Lane, London EC4. The closing date for applications is 30th April.

Technical Translation Bulletin

Members who are interested in the problems of translating are reminded that the Aslib Technical Translation Group produces its own *Bulletin* which is available to members of Aslib only, price 30*s* per annum. Members of the Group are entitled to a reduced rate of 20*s*.

The *Bulletin* is issued three times a year and is ten years old. Vol. 11, no. 1, Spring 1965, should be ready early in April and will contain a report of a talk by Mr A. T. Pilley on 'Interpreters at international conferences'; a report of a recent discussion by the Group on 'Whether a translator is justified in improving the original text'; an article by Mr R. Sewell on 'The problem of Chinese technical literature'; and its useful bibliography section, listing new dictionaries, and terminology section to which members of the Group can contribute. The terminology section records new meanings which are not given in dictionaries but which have been deduced from the context; it also carries notes on matters of interest to translators, giving details of technical glossaries forming part of larger publications.

A survey of the aims of the *Bulletin* was published in *Aslib Proceedings*, vol. 15, no. 6, June 1963, p. 152–3. Full up-to-date information may be had from the Liaison Officer, Aslib.

IFLA. Special Libraries Section

As many members will recall, a Special Libraries Section of IFLA was formed at the conference in Rome in September 1964. Aslib has now joined IFLA as an Associate Member and hopes to make a special contribution to this section in particular.

Development of New Products

Arthur D. Little Ltd are holding a conference on 'Development of new products and market introduction' at Eastbourne from 17th to 20th May. This will be the second working conference of its kind to be held by the organization in the United Kingdom. There will be a detailed programme of presentations and discussions; published summaries, including for example *Management of technical programmes,* will be distributed beforehand.

The conference will be at the Burlington Hotel, Eastbourne, and the fee will be 95 guineas. Programmes and application forms (which should be returned by 30th April) can be obtained from Mrs D. S. Franklin, Conference Secretary, Arthur D. Little Ltd, 197 Knightsbridge, London SW7.

In-Service Training

The proceedings of the 12th Annual Conference of the Reference, Special and Information Section of the Library Association, held in Nottingham in March 1964, have been published under the title *In-service training.* The conference opened with an address by Mr H. Davies, Director of the Institute of Education of Nottingham University, in which he stressed the need for librarians to be educated to understand the development of the society in which they live and work. There followed three papers in which Miss L. V. Paulin, Mr F. J. Bungay and Mr R. G. Griffin discussed the problems of in-service training from the points of view of public libraries, the library schools and special libraries respectively. The need for the early establishment of a Library Assistant's Certificate was expressed several times, both by the main speakers and in the discussion. Finally the recommendations on in-service training of the Library Association Council are reprinted from the *Library Association Record,* May 1962, as an appendix. The volume is edited by Miss Amy Mason, and is published by the Library Association, price 10*s* (7*s* 6*d* to members of the LA).

A NEW UNIVERSITY PROSPECT

Chairman, Geoffrey Woledge, B.A., Librarian, British Library of Political and Economic Science

Evening meeting, London, 26th January 1965

I

BOOK PROVISION FOR THE NEW UNIVERSITY

DENNIS COX, B.A., A.L.A.
Librarian, University of Sussex

THE dreary months of midwinter are enlivened for university librarians by the arrival on their desks of the annual reports of their colleagues. These reports, from whichever part of the world they come, are now almost without exception variations on two main themes. First the achievements of the session under review accompanied by statistics which show *increases* on the considerable achievements of the preceding session. Second a plea for greater sums of money to buy more books, to pay more staff to process and exploit them, and often to build new libraries or extensions to house growing collections and larger student numbers.

Here are the opening sentences from three recent reports:

> 'In the year which saw the publication of the *Robbins Report* it is both natural and fitting that a substantial increase in the pace of the Library's expansion should be recorded.'
>
> 'This was a year of some expansion and of planning for much more. Rather more money was available, and as will be seen below, the intake reached a higher figure than in any previous year.'
>
> 'The past year has been epochal in the history of the University Library.'

These reports, then, are a reflection of the simultaneous expansion of the numbers receiving higher education and of the numbers of scholarly publications printed. It is in this age of expansion that the new universities have been born. They owe, indeed, their birth to it. The first important point to be made is that the new institutions and their libraries are but one strand in the great expansion. Many of the older universities are experiencing equally dramatic growth. There is one important difference for the new libraries: they must get as far in years as others have got in decades or longer. They have had to begin from nothing.

It is a curious paradox that universities should avowedly consider their main responsibilities to be the conduct of teaching and the promotion of research but that sufficient funds should not be made available to their libraries in support of these responsibilities. Yet it is the libraries which contain the principal media, books and periodicals, by which existing knowledge is handed on and new discoveries made known. It is not the purpose of this paper to attempt an explanation for the demotion of libraries when academic priorities are translated into financial. It is part of its purpose to state categorically that an adequate collection of books is essential to any university.

No one is in a better position to witness the need for books than the library staffs of the new universities. In possession of comparatively little during the first months and years, their readers draw attention daily to the gaps on the shelves. The undergraduates are more numerous. They need books for essays to be written within two or three days. The demand for and use of books in a university adopting, as all the new ones do, the tutorial system of teaching is likely to be greater than that in a university teaching mainly through lectures. Yet the provision for undergraduates is a task which the new university libraries can accomplish without too great delay.

Once the subjects to be taught are decided most of the books choose themselves. In literature the standard editions of authors and the major critical works about them are acquired; in history some of the primary sources as well as the secondary; and so on. The acquisition of the selected titles presents difficulties of two sorts.

First, in respect of in-print books, there are the delays in getting books from booksellers. It is to the credit of the new universities that their librarians have been appointed at least a year before teaching has begun. But although not inconsiderable collections of books await the arrival of the first students, inevitably new courses are started and different titles other than those anticipated are given emphasis without sufficient warning to the library. Delays in the supply of books can be puzzling to librarians, who know something of the complexities of distribution. They are frequently inexplicable to readers, who have the curious notion that virtually any book is available by return of post. How could so many titles be kept in stock?

Secondly, there is the difficulty of getting out-of-print books. There are three ways of trying to overcome this: by searching through second-hand catalogues, with the probable disappointment that the bookseller will have received an order from somebody else before your own; by asking booksellers to search and quote; by resorting to xerographic copies. Xerography is an immensely significant, beneficial, new technique. Its value to libraries is reduced both by its incapacity to reproduce high-quality illustrations and also by the delays and frustrations which arise in seeking copyright permission. Many programmes—in the development of which librarians have not yet played a sufficient part—for reproducing out-of-print books have been given impetus by the needs of new and expanding libraries. Not all, unfortunately, seem to place service to scholarship above a desire to make profits. Like most problems, that of getting copies of out-of-print books becomes less in inverse proportion to the amount of money that is available for its solution.

In the provision for undergraduates the new universities have been more ready to multiply titles than many of the older institutions—although Oxford and Cambridge with their patchwork of university, faculty, and college libraries buy more copies than any other university and offer a better service for that reason. This does not mean that the new librarians do not expect students to buy books. Both Sussex and East Anglia already have bookshops on the campus. It does mean that they recognize the wastage of time and the inefficiency of teaching without an adequate supply of books. No magic formula has been found by which the most efficient pattern of duplication may be achieved. The perennial choices of whether to confine to the library or to lend, of whether to lend for short or long periods, are made in the new libraries and in the old as much intuitively as after a survey of the unavoidably incomplete evidence of demand and use.

The problems posed by the provision for undergraduates are interesting but those that arise in assembling material for members of faculty and for research students are more complex and more fascinating. All the new universities have the authority to grant research as well as first degrees. There are research students as soon as there are undergraduates—in Sussex, for example, nearly two hundred postgraduates at present. The new librarians do not share the view sometimes expressed that they cannot build up important research collections. The Americans, with greater funds, have shown only too clearly that this is possible. They believe that they must assemble significant collections if they are to begin to support the work of their universities. Only inadequate funds can prevent them from doing so.

The new libraries must assemble in ten years collections of *at least* 250,000 significant volumes. We hope to do better. The modesty of this total has to be seen against the general background of university library development in this country. In Sussex, the first to start, the library will be half-way to this total in five years—without counting microform publications such as the microprint of British Sessional Papers and without counting special collections such as some twenty thousand pieces of non-orchestral music. The second 125,000 volumes are likely to be more expensive to acquire than the first, and more funds will be necessary if the target is to be achieved. In numbers, of course, the collections in the humanities are much more numerous than those in science.

As far as current material is concerned the tasks and opportunities of the new libraries are no different from those of the old. They likewise will be serving their readers best if they are able to place before them substantial numbers of books and periodicals recently published. In respect of older material it is improbable that any of the new libraries will ever possess as fine a collection of early printed books or medieval manuscripts as the Universities of Cambridge and Oxford. This does not cause their librarians undue distress, for they are primarily concerned with building up, in the humanities, collections of significant items published since 1800, and in the sciences books and periodicals published in this century. There are exceptions but these are not numerous. The reaffirmation has to be made—only a lack of funds will prevent them from doing so. Moreover, there is the possibility, indeed duty, of developing special collections which will in time have the prospect of achieving national stature.

Books are of course most useful when immediately to hand. The foundation of seven new universities at a time when more and more books and periodicals are being published than ever before has thrown into greater prominence, however, a question which has faced research libraries for a long time. Where does local self-sufficiency end and where does sharing the resources begin? All university librarians rightly try to assemble rich collections. In addition they have, with great generosity, long co-operated to make these collections available to all either by personal visit or through inter-library loans. Recently, moreover, the foundation of the National Lending Library for Science and Technology has transformed the national provision of scientific and technical literature.

But are there not more effective ways of increasing local resources—possibly even at proportionately if not totally less cost? Are there not more sophisticated ways of co-operation with consequential benefits to all readers? One of the most pressing tasks facing librarians is, despite the enormous obstacles, to find them. Advances, if they are made, will come only after a vigorous, continuing, concerted attack. The attack will include not only an examination of the use of photographic techniques including microphotography and an examination of the capabilities of systems of telecommunication. It will also include a re-examination of more traditional methods, locally, regionally, and nationally.

Lest it be thought that this plea is made from a position of weakness, let me quote the latest annual report from the librarian of the University of California at Los Angeles. No library has a more vigorous, ambitious policy than his.

> 'Most definitely, from a national point of view, American research libraries are badly undernourished in the face of the demands put upon them, to the extent that perhaps only a concerted national effort can sufficiently bolster them. . . . Clearly what is needed is a broad national effort on behalf of the total, fundamental research library community.'

Dramatic expansion of learning in the past has been accompanied by dramatic technical changes in the production of books—for example, the invention of printing itself in the fifteenth century and the transformation of its methods in the nineteenth. Similarly the techniques of librarians have changed. From preservers and custodians of books for closed use by a few, they have come to catalogue and arrange them in subject order for open use by many. The expansion of higher education in old and new centres will be thwarted unless more sophisticated methods are discovered of making knowledge and ideas speedily available to inquirers.

The opportunities for librarians are great, and they begin to see them. With a concerted, vigorous attack they will, given the necessary funds, grasp them. Old libraries, as well as new, will equally benefit. This is a time of newness, of rebirth, of change for all.

A NEW UNIVERSITY PROSPECT

II

ACCOMMODATING THE LIBRARY IN THE NEW UNIVERSITY

HARRY FAIRHURST, M.A., A.L.A.
Librarian, University of York

Evening meeting, London, 26th January 1965

'THIS,' wrote Mr Mackenzie a few weeks ago, 'is the first formal report on the working of the Library; it covers a period of rather less than a year—from 16th September, 1963, when the Librarian arrived in Lancaster with half a dozen books in his brief-case, until 31st July, 1964, when an effective library was in operation with a stock of over twenty thousand volumes.' There, if we forgive Mr Mackenzie for his poet's licence, is the essence of the accommodation problem with which each new university is being faced. We are not being asked to expand existing book and reader accommodation, or to replace it by new building. We have started with nothing and we have to be operational a year or eighteen months afterwards.

The question of temporary accommodation need not detain us unduly, but it is not without significance; standards of service and the stature of the library within the university are soon established, no matter what the surroundings. The fundamental information required is simple—the projected growth rates for the first two or three years of undergraduates, postgraduates, and academic staff, plus information on the phased introduction of subjects, plus an indication of the sum available for book purchase. An accession rate can be projected, and areas required for books, readers and library staff can be calculated, bearing in mind the fact that the rate of growth of library staff ought to be at its maximum during years 1 to 4 of the university. I think that an area of not less than 25,000 square feet is needed for temporary accommodation for the library which has to survive for three to four years before the completion of its permanent building, which has to cater for the teaching needs of fourteen subjects, and which has to provide the reading accommodation needed for a total population of a thousand undergraduates and 150 faculty in year 4.

The difficulty, of course, is that the new university is invariably short of space for its total needs during these early years, and the librarian has to compete with other departments for what is available. You will know already of the various solutions adopted. I am convinced myself—short of the invention of expandable accommodation—that a temporary library of unit structure, that can be added to easily as required, is the ideal solution. I would not care to repeat the process of squeezing into a baronial hall at York, without adequate space for even limited expansion. Were I to begin again I would prefer to take to the fields in a type of hutted accommodation I first met in the army, and which I believe is known as a 'spider'. This, I believe, could be ideally suited to the needs of a library during its first years; it would certainly be preferable to the fragmented expansion we are experiencing at the moment.

But it is the planning of the permanent building that is a central feature of life in these early years, and which makes life bearable, even in the most cramped temporary quarters. The librarian of a new university is of course, in one respect, placed at a tremendous advantage when compared with his colleagues in the older universities. He is dealing with an open site, and he should be in a position to discuss the location of his library in relation to the whole campus. I think that most of us will accept the arguments for a centralized library service as opposed to a departmentalized service—but central siting is vital for the success of a central library, and even five minutes' walk is beyond the scope of some academics. It is essential, therefore, that the librarian be consulted as early in the university planning stages as possible, and that he should be able to express his views not only on the detail of his own building but also on its relationship to the whole plan.

The type of service to be offered will greatly influence the type of building that is conceived. But, first of all, who is responsible for the conception? Universities by their nature are creatures of committees and their diet is frequently one of compromise. Libraries by their nature expose themselves to a welter of amateur advice. The number of academics prepared to undertake the planning of a laboratory is strictly limited—the number prepared to undertake a similar task for the university library is equal only to the total available number of academic staff at any one moment. Library planning, though, has become a more exact science in the years since the war. As yet, the library consultant has not appeared in Britain to perform a function similar to that performed by Ellsworth or Metcalf in the United States. Frankly, I would challenge the advisability of such a development in this country; I am much more in favour of a team consisting of librarian and architect in a partnership established as early in the planning stages as possible. You will be familiar with the theoretical procedure of the University Grants Committee, by which the architect cannot be formally engaged until after the approval of Schedule I and the establishment of a provisional cost limit. To expect an architect to enter a project after the basic calculations on areas have taken place is to impose unnecessary restrictions on him. He must be in possession of the fullest information as early as possible. The librarian, for his part, must equally possess the fullest possible information on the projected academic development of the new university—the rate of student growth, the phased introduction of new subjects, the possibility of experiment in subject relationship (the Sussex regional studies, for example), the programme for the construction of other accommodation, and so on—everything in fact that is contained in the ten-year *Development programme* published by my own university in 1963, which provided for the librarian an invaluable summary of aims and intentions.

Armed with this information, librarian and architect can discuss generally and in a preliminary way the role of the library within the new university, and the sort of building best suited to give expression to this role. Only, I think, after such discussions, should the librarian prepare his detailed brief. In this he must state clearly his basic philosophy about his library: he must tell the architect about open access; he must tell him what his attitude to readers and borrowers is; he must tell him what sort of a part he envisages the library as playing within the university—is it a dormant storehouse or an active and integral part of teaching? Having done this, he must list the accommodation required in detail, and he must indicate the relationships between the separate parts. It is on the basis of this that I think the first schedule should be formally submitted for UGC approval.

All this is elementary and is applicable to any library building, university or otherwise. Where the new universities differ is in the lack of precedents in this country for the rate of library growth. Fremont Rider's calculations have long since been discounted and they were in any case only applicable to an established university library. One can only look at the world rate of publication in the general academic subjects and at the known volume of publication to date, at the size of existing libraries both here and overseas and at their development plans, and at theoretical calculations such as the one upon which the rate of expansion at the University Library in Cambridge is being planned. Clearly one cannot create the ultimate in one stage of building, but at least it is perfectly feasible to postulate an ultimate size—whether it be one or two or five or more million volumes towards which the university library will grow over the next fifty to a hundred years, for which space can be earmarked now, and towards which the first unit of building will be a contribution as well as being a coherent whole whilst it exists by itself. Because one can only start by building a fraction of the ultimate, it follows that one must have a building that can be changed internally with the minimum of difficulty and disturbance. Maximum internal flexibility is, I think, the key to the planning of a library building in a new university and it is the need for flexibility which will most constrain the architect in working out his side of the partnership.

The debate on the conflict between fixed-function and modular library building has only been taken up in this country relatively recently. Most of our universities have inherited fixed-function buildings as a legacy from the last century or the earlier part of this century—many have had fixed function thrust upon them by the necessity to occupy accommodation which was not designed specifically for library use, or to expand into such accommodation. No matter what the reasons are, we do have a tradition of the reading room and the stack as separate identifiable units, and what is suitable accommodation for the one is not suitable accommodation for the other. There can be no doubt that this imposes on a building a rigidity of internal layout which is undesirable and a separation of books and readers which can be frustrating. One is aware, of course, of the aesthetic value of the well-proportioned and well-furnished reading room and of the atmosphere it creates, and of the high-density shelving it is possible to use in separate and often closed stacks. But I think we are justified in asking whether this is what our readers now want, and whether we should now impose as few barriers as possible between them and the literature they need to use—and as much of that literature as possible. Even more, as I have said, the fixed-function building is ill-suited to the needs of a new university which can site its library now in the position which it will still be occupying comfortably in, say, a hundred years' time.

Modular construction, as you know, involves the building of a grid of load-bearing columns on centres which vary from 18 ft. 6 in. upwards. At York we have chosen 22 ft. 6 in., which appears also to be the most generally used. The columns in turn carry floors with a constant load-bearing capacity capable of carrying either readers or books, or both. External walling is largely curtaining; internal division is mainly by demountable partition, except where fire regulations or acoustical requirements demand a more solid division. The result is a series of large areas which can be subdivided as necessary, and which can be altered as necessary as and when there is an alteration in the use to be made of a particular area. The large reading room is replaced by smaller reading areas, more closely related to the books themselves—the size and distribution of these areas can be changed. Internally, by arrangement of shelving and tables, the librarian becomes his own architect. One has, of course, to accept uniform low ceiling heights. It is in the development of the open-plan building that the new universities could make a major contribution to the re-evaluation of library planning in this country. There will, however, have to be a change of thinking by the University Grants Committee if open-planning is to be really effective. There seem to be only three basic area standards laid down at present—25 square feet per reader, 60 square feet per thousand books (assuming seven shelves per strip), 40 per cent balance area.* Twenty-five square feet is not adequate for reader places in any area reserved for faculty members, and is an even less accurate guide for the planning of carrels. Sixty square feet per thousand volumes, assuming seven shelves per strip, produces too high a density for the open-plan type of building I am advocating, based as it is on shelving at 4 ft. 6 in. centres. Shelving at 5 ft. centres and assuming six shelves per strip would, I think, be more acceptable in the integrated book/reader area which the modular building provides. Full air-conditioning is only permissible in exceptional circumstances—it should, I think, become the norm rather than the exception.

Two other questions can appropriately be raised. The design and layout of accommodation for library staff, and the inclusion of non- or semi-library accommodation within the library building. On the first question, it is necessary to emphasize again the need to consider the ultimate whilst planning the first stage—to project the development of library staff and technical services in the same way that future book and reader capacity is projected—to carry a mental impression of the future building whilst dealing in detail with the present. Staff accommodation can, of course, be expanded within a modular building, but one must bear in mind the degree of inflexibility imposed by access roads and goods hoists. There is, of course, no real substitute for the librarian himself working out the detail of his staff accommodation on the basis of work flow, but there is great value in allowing the architect, and even the specialist consultants, to spend as much time as they can spare in the library as it exists, watching the processes as they are carried out and talking to the staff, however junior, who actually do the work. Non- or semi-library accommodation is always a vexed question, especially in view of the conservative outlook of many librarians. There is, I think, a very good case for including in the library some teaching accommodation which can be used for seminar work in connection with library-held material assembled for the purpose, and there are strong arguments in favour of equipping one such room with a full range of audio-visual aids, particularly if the library is also the university's repository for slides, films, records, tapes and videotapes. I would myself welcome the inclusion of small group discussion rooms—we are only too familiar with the students who want to talk about their work in hand and who normally only succeed in disturbing everyone else within earshot. I am less certain about individual listening booths, though there is certainly a case to be made; I do think that a less formal area with more comfortable chairs and where smoking is allowed is a necessity, though I shrink from the use of the American term 'browsing room'.

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* University Grants Committee. Non-recurrent grants: notes on procedure. London, HMSO, 1963.

The university bookshop can well be incorporated in the library building: at York, partly because there is no union building, we will have the added advantage of a cafeteria run by the university's catering staff. All these are fairly obvious possibilities, but I do wonder whether one should not go further towards creating a library that is part of a university communications complex containing, for example, the language laboratory, the computer laboratory, and even the central studios for the university's closed-circuit television system which must come some day.

What we must work towards is a library which is entirely functional and easy to use from the point of view of both reader and library staff, which is as flexible as possible to cater for expansion. What I want is a library which is alive, and which is seen to be alive, within the university; which is not only an efficient storehouse but which also invites use. For all this the design of the permanent accommodation is critical. You may be forgiven, perhaps, if you are left with the impression that the main item of equipment on the new university librarian's desk is a rather tired crystal ball.

A NEW UNIVERSITY PROSPECT

III

SERVICE, STAFFING, EQUIPMENT AND METHODS IN THE NEW UNIVERSITY

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Librarian, University of Lancaster

Evening meeting, London, 26th January 1965

MY colleagues have dealt most admirably with two detailed aspects of starting a new library from scratch; with a certain amount of low cunning, I have reserved for myself the task of speaking more generally about the end product of their efforts—for books, no matter how lavishly they are provided, and buildings, no matter how well planned and executed, are only the essential preparation or raw material for the librarian's proper task of getting information (whether in books or serials or pamphlets or videotape) to the people who need it.

It would be too strong a statement if I were to say that this cardinal function has often been neglected in universities in the past; but nevertheless there is an element of truth in this. The old ideas of mere custodianship die hard, and the public image of a library, even within the academic community, is still in many cases that of a place where books are *kept,* a scholarly sanctum for the misfit who can practise no profession which might entail more than a little gentle mental exercise. Let us be fair: there are perfectly valid reasons for this traditional picture of the semi-passive librarian. For many years we have been struggling against long odds—mainly historical and financial; there has been too little money for books, for buildings, and, most important, for staff. A first-rate service can be provided in a poor building; one can do a great deal even with a limited book-budget; but unless the staff is adequate both in quantity and in quality there is no chance of giving readers the type of service which they require—even although they may sometimes not realize they need it, after years of being accustomed to the second best. It is a sobering thought that the average university librarian, when told by his secretary that Professor X is at the door, automatically falls into a defensive frame of mind: we are all too conscious of the defects in the service we can provide, and we expect complaints rather than praise.

I do not wish to claim that we, in the seven new universities, have any monopoly of good, or even of new, ideas; this is obviously not the case. We do, however, have better opportunities for putting into practice some of the theories and principles which our senior colleagues elsewhere have been developing for years. We all started with a *tabula rasa*: there were no established patterns of cataloguing or classification, no entrenched faculty—or, for that matter, library staff—resisting change, no departmental libraries or other special privileges; on the contrary, most of us—this is certainly true of my own university—were actively encouraged to examine the operation of a library with a critical eye, and supported by our colleagues—dons and administration alike—in activities which must at times have seemed revolutionary.

I think everyone will agree that the traditional static library should vanish, and metamorphose itself into a dynamic collection of educational and research materials; it is not so easy to find agreement on the best way to do this, and even then there is still the problem of how to pay for it!

The question of book provision has been dealt with by Mr Cox; if we assume that our ideal library has an adequate stock we must decide how best to use it. We have three main classes of reader, with quite different requirements: the undergraduate, the graduate student, and the teacher or senior research worker.

The typical undergraduate comes up in his first year with very little idea of how to use a library efficiently; he will have worked in one at school, and possibly in his local public library as well, but when he is faced with a collection of 100,000 or 500,000 volumes he is quite understandably at a loss to find anything apart from the minimum required reading, and needs some guidance other than the traditional ten-minute talk and tour round the reading room and catalogue, perhaps supplemented by a printed guide in a vain attempt to fix the fleeting impressions that are all he can gain from this treatment.

One way round this difficulty, which we are exploring at Lancaster, is to install near the catalogue one or more teaching machines, programmed to explain the workings of the library in general and the principles of cataloguing in particular. We feel that the novelty of this approach may tempt readers to learn the basic facts about the mechanics of library use which they need to know, and of which they all too often remain ignorant for the whole of their time at university.

As soon as an undergraduate has selected his major subject (in Lancaster, at the beginning of his fourth term) we shall provide a series of bibliographical seminars for each subject, in the course of which we shall cover (very briefly) general reference works and the specialist literature which will be of most use to him in the next two years. These seminars will be part of the official departmental time-tables, and we shall probably demand some written or practical work from each student attending them, both for its own sake and for the psychological effect on the students themselves.

We also intend to run similar seminars for graduate students at the beginning of their course or research; this is necessary because many graduates will come from other universities without the benefit of our undergraduate courses, and also because the problems of the graduate require treatment at a more advanced level. We carried out a pilot project of this kind last term, talking for about three hours to a group of graduates in physics and chemistry, and following up with three hours of practical literature searching on topics allied to their own researches; a visit to Boston Spa and a showing of the film *At your request* helped to demonstrate the wealth of literature which is available, and we were very pleased to receive appreciative comments from many of those who took part. These seminars also helped to convert some of the dons who were doubtful of the value of our teaching programme. It is worthy of note that such courses of training were seen to be desirable as long ago as 1948,[1, 2] but that until recently there has been little systematic attempt in any of our universities to provide them in this country.[3, 4]

What of senior members of the university? There is no reason in principle why an academic library should not set out to provide the kind of service which an industrial or special library supplies as a matter of course. The librarian, if he is doing his job properly, and if he is of the right calibre in the first place, must be aware of many of the problems facing the research worker, whether in the arts or the sciences; he should know the techniques of research, and many of the specialized sources which can provide the answers. It is logical that he should put this knowledge to its best use by conducting literature searches, compiling bibliographies, and generally using his acquired skills to free the research worker from routine work as far as he can.

Obviously there are limitations to this principle: the don will usually know more about the minutiae of his own subject than even the most expert librarian; the research student should not be helped too much, as part of his task must be to learn to do his own searching; and—most important—even in a library staffed more generously than our most optimistic forecasts will permit there can never be enough staff to perform this type of service on a large scale for everyone.

I believe, however, that we should admit that the principle is valid, and do what we can with our limited resources to implement it in practice; this is an aspect of librarianship which is closely allied to, and dependent on, our traditional tasks of building balanced collections and maintaining them for posterity.

The obvious corollary of providing this type of service is that the staff must be organized by subject specializations rather than in the traditional division by function—so many assistant librarians cataloguing, so many looking after a rudimentary reader service, acquisitions, binding, and so on. There are, as we all know, difficulties about this: real subject specialization depends on having senior staff all of whom are experts in the subjects for which they are responsible —and in the university context this virtually means having read these subjects themselves, or at least having considerable experience in them. Where are our libraries to get an adequate supply of physicists or biologists, or technologists or Russian scholars?

Part of the answer lies in salaries and conditions: if the library can provide a career that is as rewarding financially as the teaching side; if it can provide opportunities for exercising the knowledge acquired over the years; if it can offer facilities and free time—including sabbatical terms or years—for individuals to pursue their own academic research, then we may hope that a few more of the rare scientists may be attracted. But there is one further bar to their recruitment, one which is probably a greater deterrent than any of these things: that is the mis-employment which is only too common today.

How can we afford, if we wish to run our libraries on a subject divisional basis, to force highly qualified graduates—and there are many among our ranks —to spend much or all of their time mechanically transcribing title pages for the all-consuming catalogue?

How can we afford to have them laboriously checking the correctness of the headings on a pile of issue slips, or of the details of a typed order sheet, or of the collation of a periodical just back from the binder? These tasks are indeed important (that is, unless we can find mechanical methods to make them unnecessary, or avoid them by rethinking our procedures); but, by and large, they are not tasks which require a detailed knowledge of the second law of thermodynamics or Homer's usage of the enclitic γέ.

Of course we cannot afford all this; libraries in the universities are caught up in a vicious circle (which is not of their own making); until we get enough good graduates we cannot provide a proper service to our readers; until we provide the service we cannot justify to our Senates the academic status which we claim, and which alone can improve conditions and salaries; until the conditions and the work itself are made more attractive we cannot recruit staff in the subjects where they are most needed—and so on.

The weakest link of this chain is the last one, and it is here that we in Lancaster—and most of the new universities—are following the example of one or two pioneering spirits in the older libraries. At more than one meeting in the past few years the University and Research Section of the Library Association has discussed the staffing of academic libraries, and strongly supported what has come to be known as the 'three-tier' structure, something like the German pattern,[5] with academic subject specialists responsible for book selection and general stock control, bibliographical work with individuals or groups of readers, and liaison with the teaching staff. Working closely with these are a number of qualified librarians, who may or may not be graduates, and are responsible for those parts of the running of the library which require professional expertise and judgment, but not necessarily any deep subject knowledge; they are typically responsible for descriptive cataloguing, acquisition procedures, binding, oversight of the issue system, and similar tasks. The third tier of this structure is formed by the junior assistants; they carry out the purely routine operations of the library, and are normally responsible to the professionals.

The advantages of this system are many: it makes possible a much closer link between the library and its users, and therefore a much improved service; it partially frees the academics from routine so that they may pursue their own interests more freely (thus stimulating recruitment); it stimulates the interest of junior staff by providing the possibility of a career within the university, instead of a dead-end job; and, not least important, it produces the same amount of work for the library at a lower cost, since the professionals will not normally reach such a high maximum salary as the academics. (This last has proved a very telling argument with university administrations!)

This question of cost is important; the average total library grant of British universities (excluding Oxford, Cambridge and London) in 1962–3 was only £57,000, or about 4 per cent of their total income;[6] with this level of expenditure it is virtually impossible to provide the type of service I have outlined and still purchase an adequate bookstock: where a choice has to be made most librarians tend to concentrate on the latter—and quite rightly. The time has now come for us to reconsider our position: university authorities must recognize that they will not get the service they need unless much more money is made available for staffing as well as for books.

On our part, we must also recognize that our routine operations must be carried out as economically as possible, although without sacrificing necessary standards. This implies making clear in our own minds what we are trying to do, and ruthlessly throwing overboard anything, however hallowed by tradition, which does not contribute to our stated aim of getting to the reader in the shortest possible time the material he needs, whether it be book, pamphlet, periodical, record, film or teaching machine programme, or merely a bit of information.

This brings us to the question of methods and equipment. One of my colleagues has told a story against himself which illustrates this point well: shortly after his appointment he was heard by his wife sitting muttering to himself beside the fire; when, with suitable conjugal concern, she asked what was worrying him, he replied that he was merely wondering whether a shelf was the best way of storing books. Well, none of us has abandoned the use of shelves—yet; but this attitude, the continual and searching re-scrutiny of accepted dogma, is typical of the atmosphere of the new libraries.

The most expensive item in any university library, apart from books, is undoubtedly the catalogue: this is, in many cases, a masterpiece of the bibliographer's art, reflecting the devoted labour of skilled librarians over many years. However, I am not convinced that such elaboration is needed in any but the biggest libraries: we can purchase the catalogues of the British Museum and Library of Congress, the British National Bibliography and the Cumulative Book Index to provide for our readers a source of detailed bibliographic information. What is needed from our own catalogues is twofold: first of all, an unambiguous record of what is actually in our library, with directions for finding it on the shelves, and secondly, a more detailed analysis of stock so that an approach through the classified catalogue will be more profitable than it usually is at present.

To do this it is not necessary—indeed it is thoroughly wasteful—to spend hours tracing the full name of the author of an obscure book, or the chairman of a government committee: in the few instances where such information is really needed it can be found later, either by the reader himself or indeed by the library staff. Similarly, it is seldom that anyone except a professional bibliographer will care whether there are iii or xxiii pages of preliminaries in an ordinary commercially published book—if this question does arise the standard bibliographies or the volume itself will provide the answer, and eliminate many wasted man-hours of laborious counting.

That economies can be made by such simplified cataloguing (and I have only quoted two very obvious examples) is quite clear; but the scale of these economies may surprise those who have not given the matter much thought. Statistics can, as we all know, be highly misleading, but a comparison between the productivity at Lancaster and elsewhere shows that our output per cataloguer, at six thousand titles per year, is at least twice as high as in any of the older universities for which I have been able to deduce figures; what is more important than the sheer volume of output is that the quality of the catalogue is adequate for all our foreseeable future needs.

The rumour is going around that Lancaster is a university with a bias towards technology. In the academic sense this is quite untrue: we have a fairly normal spread of subjects, and in fact in our first year we are not even teaching any of the laboratory pure sciences. On the administrative side, however, we do believe in efficiency, and in the use of labour-saving machinery wherever possible.

Probably the biggest advance in library economy at the present time is the possibility of using a computer to store and process the myriad records which a large library needs. As you all know, the Library of Congress has completed a feasibility study which recommends an expenditure of $70 million on the complete computerization of their catalogue and order systems, and some large universities in America are thinking along the same lines.

None of the seven new universities in this country has yet got to this stage—although Essex has been offered a computer—but some of us are beginning to investigate the possibilities of data-processing equipment. Sussex are probably the pioneers here, and have developed a punched-card issue system which can very easily answer most of the questions which they need to ask; when the university acquires its own computer it will be a simple matter to feed the raw data into it, thus making the processing easier and more rapid than at present.

Warwick, York and Lancaster are approaching the problem from the other side; we have all invested in a punched-tape typewriter which can be programmed to produce a complete set of catalogue entries—including added author or classified headings—from one master typing. This not only has the advantage of saving typist's time, since one girl can produce in a year about 25,000 complete sets of cards, but in addition only the master needs to be checked for accuracy, thus saving the cataloguers' time as well. If—when—we get a computer in the university it should be comparatively simple to use the Flexowriter as an off-line, or even an on-line, input, and we are just beginning to consider how best the computer can be used in the cataloguing process: should we produce at intervals a complete printed catalogue in book form, or can we go even further, miss out the intermediate stage, and have equipment which will let any reader ask questions directly of the computer itself and transmit the answers to any part of the campus by CCTV? I have no doubt that in the next few years this will be technically possible; whether this advanced and expensive concept will ever be viable in a library that caters for a mixed undergraduate and research readership is another matter. Whatever the final form of the catalogue, however, I expect that libraries will shortly have to learn more about data processing; and I expect that one at least of the new universities will be among the first to put this new knowledge to practical use. The climate of opinion is favourable to us; we are expected to experiment with new methods and equipment; the accepted methods of librarianship are no longer good enough to provide the results that modern scholarship deserves.

I make no apology for stating a philosophy of academic librarianship which may seem strange and extreme to many, even of my contemporaries: I know that not all of what I have said meets with the approval of my two colleagues on this platform; but I believe firmly that the time has come to experiment; the universities have for too long been static. We know ourselves, as I have said, that we are not perfect, and that any advance must carry with it the possibility of error—perhaps expensive error. This is a risk we must take; I only hope that when we in our turn become fossilized, as all libraries must in the course of time, succeeding generations of new institutions will be able to carry on where we leave off.

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GENERAL DISCUSSION

Mr D. J. Simpson (IBM United Kingdom Ltd) wished to know if the new libraries were planning stocks and services to allow students to read and learn outside their set studies.

Mr Cox, replying first, said that a library embracing all subjects and on open access should naturally encourage readers to browse outside their set studies. It was difficult to see what the library by itself could do beyond this. The University of Sussex had no rigid departmental, school, or faculty divisions, and cross-fertilization was encouraged. It had, moreover, a large programme of seminars attended by both arts and science undergraduates.

Mr Fairhurst said that at York the university planned to have an additional library of some ten thousand volumes in each of the constituent colleges. These would be largely undergraduate-orientated, with small collections in all disciplines. The undergraduate would find it easier to inform himself of subjects other than his own in such a small collection and could subsequently develop his interests in the larger stocks of the university library.

Mr Mackenzie considered that the function of a university was to provide not merely vocational training but a broad-based education; therefore the library must make its contribution. Open-access libraries, which all the new universities were providing, made free the entire book resources of the institution to the inquiring mind and should provide one of the main 'cultural' centres of university life. At Lancaster, he said, the first degree had a broad base: students of the humanities were encouraged to read a scientific 'minor' subject and in some cases this was compulsory (for example, those reading French must also spend a year studying the principles of Mathematics, Physics, Chemistry or Operational Research—and this included laboratory work); those reading the sciences were compelled to read at least one subject which they had not taken at 'A' level and were encouraged to make this one of the humanities—for example, French studies, which was concerned with the whole of the culture of France and not merely the language.

Mr M. B. Line (University of Southampton), commenting on Mr Mackenzie's paper, made two points. First, a subject division of senior library staff was not incompatible with the traditional departmental division; it could be superimposed on it. There was no reason why senior staff should not supervise areas of library activity and also select books and instruct students in their own special subject fields. Secondly, when planning instruction in library use librarians must be fully aware of the enormous amount of time involved. At Southampton University there would be next year nearly five hundred new undergraduates and ninety new research students: even if science students were excluded and other undergraduates given only one hour each in groups of ten or so, the time taken was considerable. Adding to this two or three days each for research students in small groups, the result was a quite heavy burden on the senior staff. They would continue to try to do this at Southampton as long as they possibly could, but would find it increasingly difficult.

Mr Mackenzie thought that Mr Line's two points to some extent cancelled each other out: if assistant librarians had a great many routine responsibilities they would not of course have time for their primary tasks of book selection and work with readers, either in groups or individually; and vice versa. In spite of this someone obviously must supervise the professional staff to some extent; librarians had to try to balance as well as they could the various demands made on the academics' time. In the long run it all boiled down to providing many more staff in both grades than had been possible in the past, and administrations must realize that a proper service would cost money.

Mr L. L. Ardern (Scottish College of Commerce, University of Strathclyde) asked if Mr Mackenzie's library had made its own programmes for a teaching machine or had bought them from America.

The speaker replied that the university did not expect to have machines in operation until 1966 and that only a tentative investigation of programming had so far been made. Programming took a great deal of time but if a suitable programme could be bought they would certainly consider it seriously.

Mr R. E. R. Steele (University College London) was interested in Mr Mackenzie's description of the 'three-tier' system of library staffing at Lancaster and asked him whether the 'academic' members of the library staff were given the same opportunities as the academic teaching staff to pursue their own research interests and whether they were tied down to regular hours of attendance in the library; if not, whether this caused ill-feeling among other members of the library staff who did not have this freedom.

Mr Mackenzie said that Assistant Librarians at Lancaster were employed on exactly the same formal terms as the teaching staff, with a right to sabbatical terms or years, after a certain length of service; they were expected to do their own research. At the same time they must obviously spend most of their time in the library, and although no formal number of hours per week was laid down there was a gentleman's agreement on this point; in fact most of the senior staff work considerably more than the normal thirty-eight hours. Because of this the relationship between the academic and professional staff was very amicable; the staff structure was not thought of as a rigid hierarchy but rather as an intimate partnership, and the grades were separated merely by function.

Mrs V. Zissimos (Chester Beatty Research Institute) asked what the speakers thought about the provision of multiple copies of texts for undergraduates' use on a subscription basis.

Mr Cox thought greater efforts should be made to ensure that students put their book grant money to its proper use.

Mr Fairhurst answered that York had certainly reached the stage where multiple copies must be provided for undergraduates' use. He felt the undergraduate should make some contribution himself. The crux of the matter was the fact that all undergraduates received £30 a year as part of their grant specifically for the purchase of books and related items. Only a small proportion of this sum was actually spent on books. One solution might be to pay a part of the grant direct to university libraries for the specific provision of multiple copies.

Mr Mackenzie said that this had been considered at Lancaster but there was one serious difficulty. University fees were agreed by the Committee of Vice-Chancellors and could not be increased unilaterally, so that a compulsory fee could not be levied. If they were to do this on a voluntary basis they would then be depriving those who had opted out of a facility which it was their duty to provide, and without which students would find it very hard to do their work adequately. With regret they had to find a different solution to the problem.

Mr Anthony Thompson (International Federation of Library Associations) wanted to know what modules were used or planned to be used by the new universities for their libraries, and why. The following replies were given by the speakers and other university librarians present:

> *Mr Cox* (University of Sussex): a module of 20 ft. was in use. The size had been largely determined by the desirability of having a module which could be used in other new buildings on the site.

Mr Fairhurst (University of York): there was a planning module of 4 ft. 6 in. and a structural module of 22 ft. 6 in. between column centres. These related to multiples of stack units (3-ft. shelves, 4 ft. 6 in. between centres of ranges, 6-ft. aisles, etc.).

Mr Mackenzie (University of Lancaster): the university library was completely modular, all floors load-bearing, columns on 18-ft. centres in each direction. The architects and consultants had advised that this was the most economical spacing and the one that best fitted the module of the overall site plan, which was for a concentrated urban development with a continuous line of buildings on either side of a pedestrian spine.

Dr W. S. Mitchell (Newcastle upon Tyne University) cited the flexibility of an apparently rigid library construction. Two stack rooms, 7 ft. 6 in. high, had been converted for use as reading rooms, with no complaints.

Mr Philip Long (University of Essex): the module on which the University Library building was based was columns at 19 ft. 8 in. centres, which will allow for centres of ranges at 4 ft. 11 in.

Mr C. Currie (Imperial College of Science and Technology): construction of the new library was to begin this year. The module for both this and the Science Museum Library would be 22 ft.

Letter to the Editor

DISSEMINATION OF INFORMATION TO A MAJOR STEEL GROUP

Dear Madam,

It was good of Mr Sewell to comment so kindly on my paper.* I should like to point out, however, that we accept that other organizations have evolved systems for disseminating published information to selected groups of people which predate our system. Due to the different pattern of management in different organizations, different systems with different targets have been evolved. Colvilles have no elaborate structure of internal committees. Owing to this and other factors we have evolved a system aimed at top management. We hope that we are correct in believing that this system has some useful and novel features which can be applied irrespective of the activities of the individuals comprising the target audience and the management pattern of the particular company involved.

We use different colours for the various categories of abstract notification sheets simply as a means of identification. When handling about 14,000 sheets a year, any method which assists identification during the handling processes, both within and without the Information Service, is a boon to all concerned.

Yours faithfully,
R. HINDSON,
Information Officer

Colvilles, Ltd.,
Central Research Department,
Meadow Road,
Motherwell,
Scotland
15th March 1965

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* *Aslib Proceedings*, vol. 17, no. 3, March 1965, p. 88.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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MEMBER'S ADVERTISEMENTS

The charge for advertisements in these columns is *4d* per word, minimum *5s.* An additional charge of *6d* is made for the use of a box number.

ABILITY AND SERVICE. Technical or commercial translations into/from Dutch and German. Speller-Kuijpers, FIL, NGV, 6 Lakeside, Ealing, London W13. ALPerton 1045.

WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. LABurnum 7723.

TRANSLATOR OF SCANDINAVIAN LANGUAGES, ten years' experience. Member of Translators' Guild. J. T. Craddock, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

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Appointments vacant

ROYAL AIRCRAFT ESTABLISHMENT, **Ministry of Aviation.** Applications are invited for the post of Librarian Grade IV in the Information Section of the Main Library at Farnborough, Hampshire. The duties include cataloguing, subject classification (U.D.C.), information searches and the compilation of bibliographies. QUALIFICATIONS: Candidates should possess one of the following qualifications: Chartered Librarian or Associateship of the Library Association or Diploma of the School of Librarianship of London University. SALARY: £937 per annum at age 25 rising to £1,408. Higher starting salary may be possible according to experience. Three weeks' paid holiday; paid sick leave scheme. Good opportunities for appointment to established (pensionable) posts. Application forms obtainable from Ministry of Aviation, Est. 1(d)2, Room S.34, Shell-Mex House, Strand, London, WC2. Closing date for receipt of applications, 27th April 1965.

A EUROPEAN TRADE ASSOCIATION situated in South Sweden has a vacancy for a TECHNICAL INFORMATION OFFICER. The candidates must be able to fulfil the following conditions: Have a university degree and a diploma in librarianship, experience in the modern uses of cement and concrete. Besides English a good knowledge of French and also knowledge of German is needed. The position involves: Responsibility for the information services; co-operation on library services amongst the associates; organizing of contacts with documentation institutions; collection and exchange of information and promotion material such as literature, films, photographs, etc.; editing of reviews and publications. Please apply in writing to: Cement and Concrete Association, 52 Grosvenor Gardens, London SW1.

THE ELECTRICITY COUNCIL. PRINCIPAL ASSISTANT, INTELLIGENCE SECTION. The Electricity Council invite applications from suitably qualified persons for the position of Principal Assistant in the Intelligence Section at 30 Millbank, SW1. The duties will be to assist in scanning, sifting and collating published information from a wide range of sources likely to be of interest to the electricity supply industry in this country, more particularly in the economic and commercial fields; in carrying out special information searches; and the preparation of briefs for Members and Chief Advisers of the Council. Applicants should desirably have an educational background to degree level, preferably in economics, and should have some experience of economic and commercial, or technical, intelligence work. Knowledge of the electricity supply industry would also be an advantage. The appointment will be within the scale £1,475–£1,715 per annum inclusive of London allowance, depending on qualifications and experience. The maximum will rise to £1,765 per annum on 1st January 1966. Applications, stating age, present position and salary, qualifications and experience should be forwarded to K. H. Hughes, Assistant Secretary (Establishments), The Electricity Council, 30 Millbank, London SW1, by 7th May 1965. Quote Ref. ASLIB/65.

MEDICAL RESEARCH COUNCIL. INFORMATION RETRIEVAL. Graduate in Engineering, Physics, a Biological Science or Chemistry is required to work on a new research project concerned with creating a user-operated information retrieval system. Applicants should have an interest in information science and some previous experience in library organization and/or thinking in computer user terms would be an advantage. The work will be carried out in the Bioengineering Laboratory at the Medical Research Council Laboratories, Hampstead, London NW3. The salary, which will be incremental and carry superannuation benefits under the National Health Service Superannuation Scheme, will be within the range £1,600 to £2,235 per annum according to age and experience. The appointment will be for three years. Applications, giving full details of qualifications and experience and the names of two professional referees, should be sent to the Director, National Institute for Medical Research, Mill Hill, London NW7, from whom further information may, if necessary, be obtained.

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We have a vacancy in the Metal Powders Department of our Engineering Division which is located at Ealing, W.5, for a Technical Abstractor who will carry out the translation of patents and papers in foreign publications and straightforward abstracting of British patent literature in conection with powder metallurgy. An appreciation of science is necessary together with a working knowledge of German and preferably of Russian and French also.

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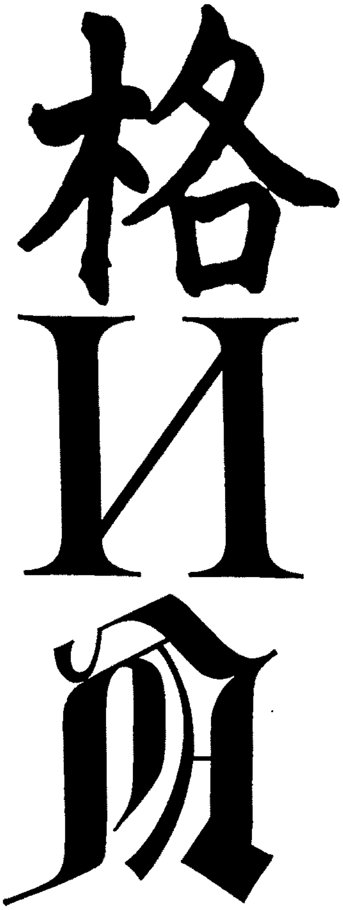

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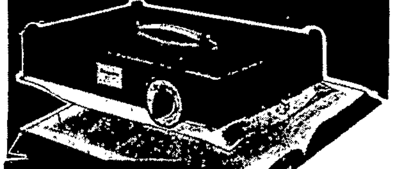

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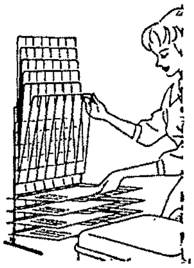

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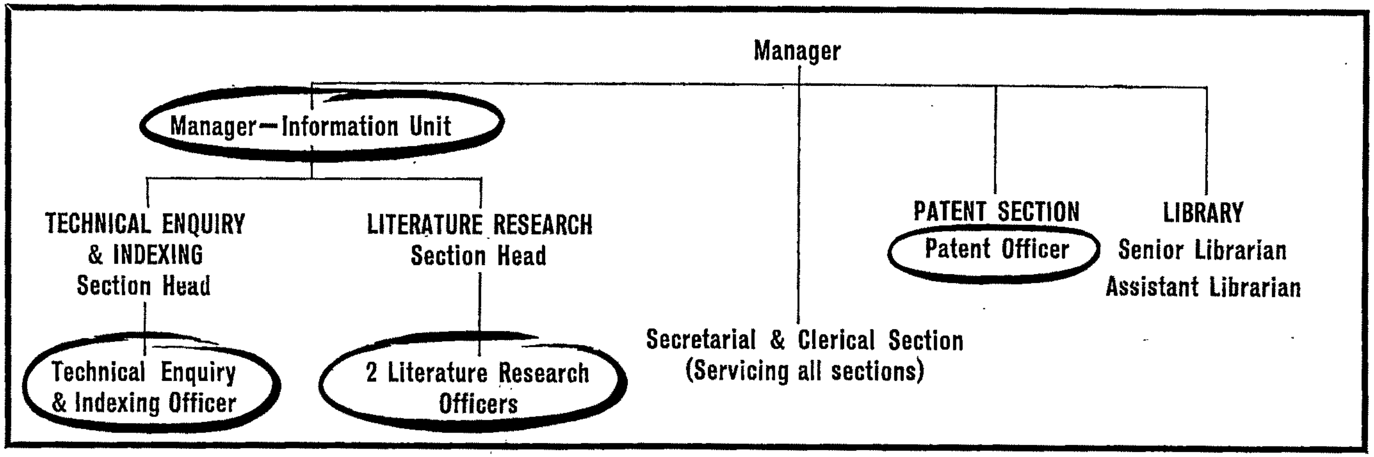
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PATENT SECTION
Patent Officer
LIBRARY
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ITS FUNCTIONS

As an integral part of the Research & Development Division the Technical Documentation Department provides a comprehensive Medical & Pharmaceutical information service to our Research & Marketing Companies throughout Europe in: setting up and maintaining a Central Subject Index with a view to introducing a fully automated information storage and retrieval system very soon; screening and evaluating technical literature; preparing and editing abstracts, translations, literature surveys, bibliographies and other publications for use within and outside the Company; providing patent information and dealing with a variety of enquiries of a technical nature. To keep pace with the growing demand for information, the Department is to expand to include the following new appointments.

MANAGER—INFORMATION UNIT

(1) To be responsible for the work of the Literature Research & Indexing & Technical Enquiry Sections, with a staff of 5 graduates.

(2) To act as Deputy to the Departmental Manager.

To do this we are looking for a graduate in Biochemistry or an allied science, who has experience of information work in the Pharmaceutical/Medical field, particularly of editing, and who has a sound knowledge of modern documentation and indexing systems.

PATENT OFFICER

(1) To maintain all patent files.

(2) To provide an information service relating to patents.

(3) To carry out patent searches as required.

The Patent Section which has just been established as part of the Technical Documentation Department offers considerable scope to a young man or woman of graduate calibre with a sound background of Chemistry or allied subjects, who has some experience of Patent work, in particular in the preparation of patent abstracts.

INDEXING & ENQUIRY OFFICER

(1) To deal with all technical enquiries involving retrieval of information from Departmental sources.

(2) To maintain a number of Indexes and assist in their subsequent transfer to an automated system in the near future.

LITERATURE RESEARCH OFFICER

(1) To screen, abstract and evaluate medical literature.

(2) To prepare and edit surveys and other publications on selected drugs or on specified areas in medicine and chemotherapy.

As the functions of these two appointments to a large extent overlap, the duties are frequently interchangeable. Although previous experience would be an advantage, both appointments offer excellent opportunities for gaining experience to newly qualified graduates in Biochemistry or allied sciences who have a liking for desk research and an interest in Pharmacology.

Knowledge of European languages—particularly French and German would be a distinct advantage in all four appointments.

The Technical Documentation Department only established 18 months, is likely to grow still more in scope and size. These are therefore responsible and progressive appointments, with excellent prospects of promotion, either within the Department or within the organisation as a whole. Our policy is to reward ability rather than seniority.

For further information please write to:— David Rowlands, Staff Director,
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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 17 **May 1965** **Number 5**

ASLIB CALENDAR 1965

May

MON.24 – FRI.28.	Course on abstracting and co-ordinate indexing.
WED.26.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Micro, micro . . .', by L. L. Ardern.
SAT.29 – SUN.30.	Engineering Group conference, Leamington.
MON.31.	Course on principles of information system design and planning.

June

WED.9.	Annual General Meeting at Aslib, 12 noon. See paragraph below.
MON.14.	Current awareness conference. See paragraph below.
WED.16.	Evening meeting at Aslib. Dr H. T. Hookway. See paragraph below.

July

FRI.9 – SUN.11.	Electronics Group 7th conference, Ashridge. See paragraph below.
TUE.20.	Visit to Port of London Authority. See paragraph below.

September

WED.29 – FRI.1.	39th Annual Conference at University of Keele.

Annual General Meeting, 1965

The next Annual General Meeting of Aslib will be held at 12 noon on Wednesday 9th June 1965 at 3 Belgrave Square. Papers will be circulated in due course. A buffet luncheon is being arranged after the meeting at the Anglo-Belgian Club, 6 Belgrave Square, and in the afternoon the departments of Aslib headquarters will be open to visitors. A separate notice and application form for luncheon tickets is being circulated and the Director extends a warm invitation to all members to take this opportunity of meeting the staff and discussing their work with them.

OSTI. New Government Organization

Members of Aslib will have an opportunity of hearing an authoritative account of this newly formed office at the evening meeting on Wednesday 16th June. The speaker will be Dr H. T. Hookway, F.R.I.C., Director of OSTI, and his title 'The Office for Scientific and Technical Information: its plans and prospects'. Mr Leslie Wilson, M.A., Director of Aslib, will be in the chair. Application forms are being distributed with this issue of *Aslib Proceedings*; the meeting will be at 3 Belgrave Square, at 5.30 p.m. (tea will be served at 5 o'clock).

In order to give members some background material, a brief note on OSTI follows. The Office for Scientific and Technical Information has been set up within the Department of Education and Science to promote more efficient handling and utilization of scientific and technical information. The broad function of the new Office will be to advise the Secretary of State for Education and Science on United Kingdom activities in gathering and communicating scientific and technical information about the natural sciences and their related technologies and relevant aspects of the social sciences. Some of its special functions will be to stimulate research, instigate new documentation systems and techniques, promote the training of scientists for information work, and endeavour to ensure that British activities in this field are effectively linked with those of other countries and international organizations.

The Office will be responsible for the National Lending Library for Science and Technology and for grant aid to Aslib, and will take over all support for research and development in this field previously administered by DSIR. It has not, however, taken over the specialized information services of DSIR; the Ministry of Technology, other departments, and the Research Councils will continue to have responsibilities for matters of scientific and technical information related to their own special interests.

In addition to setting up the new Office, the Secretary of State for Education and Science is appointing an Advisory Committee to advise him on scientific and technical information problems. Sir James Cook, F.R.S., Vice-Chancellor of Exeter University, has accepted an invitation to be Chairman of this Committee. Initially the staff of OSTI, who were formerly on the staff of the Information Division of DSIR, will continue to be housed in State House, High Holborn, London WC1 (telephone Chancery 1262).

Current Awareness Conference

Programmes and application forms for this conference, which has been arranged for 14th June, were distributed with the April issue of *Aslib Proceedings*.

Aeronautical and Technical Translation Groups

Seventy-one people attended the Joint Annual Conference of the Groups held at the College of Aeronautics on 1st–3rd April 1965. The film show on the Thursday evening was purely aeronautical but after that the honours were divided. A good start was made on Thursday morning with 'The impact of Eastern languages in the technical field' by Mr F. E. Wallwork, which was followed by an interesting account of 'Information services in the SHAPE Technical Centre' by Mrs V. A. Dowd. Dr K. P. Barr of the National Lending Library dealt admirably with 'Non-standard material at the National Lending Library' in the afternoon and the conference dinner was enjoyed by all in the evening. On Friday morning Mr R. G. Thorne gave the technical paper on 'Human engineering' which included a film on work being done at the Royal Aircraft Establishment, Farnborough. This was followed by Dr M. Goyer's paper on 'A comparison of Russian and English'. The last paper was a stimulating review of *Publication patterns* by Mr T. I. Bell. All the papers provoked a considerable amount of discussion by members of both Groups.

Chemical Group

The Annual General Meeting was held on 7th April and was followed by lunch at the Anglo-Belgian Club, which forty-three members attended, and a talk on the activities of the RAPRA Information Department by Miss D. R. Dawson, the Association's Librarian. Miss Dawson's very interesting talk, entitled 'Co-operation in abstracting', described the development of the RAPRA abstracting service and the present system of co-operation with other organizations to lessen the duplication of abstracting effort, and indicated some possible future developments of the scheme.

The Officers and Committee for 1965–6 are as follows: Chairman, Mr J. R. Clew; Hon. Secretary, Mr J. S. Rippon; Hon. Treasurer, Mrs M. A. Ferrie; Committee, Mr J. G. Hall, Mr J. A. Hanson, Mr R. Moss, Mr B. Stern, Mr C. R. Upton.

Members who have any suggestions for future activities of the Chemical Group should get in touch with the Hon. Secretary, Mr Rippon, at The Metal Box Co. Ltd, Research Department, Kendal Avenue, Acton, London W3. New members will be very welcome. They should apply in the first instance to Mrs R. L. Sauvée, Liaison Officer at Aslib.

Economics Group

The Group held its annual luncheon and Annual General Meeting on 24th March. The guest speaker this year was Miss Eirlys Roberts, Research Director of the Consumer's Association. At the Annual General Meeting the undermentioned were elected to serve on the committee for the year 1965–6: Chairman, Mr G. P. Henderson; Secretary, Mr A. W. Welch; Treasurer, Mr R. Petchey; Publications Officer, Dr A. J. Walford; Mr I. Anderson; Mr R. L.

Collison; Miss D. Grose; Mr W. Kuhnberg; Miss E. Meyenberg; Dr M. Plant; Mr I. Ross, and Mr P. Spiro.

As a mark of appreciation for Mrs E. E. Stowell's work on behalf of the Group and, more especially, for her counsel and guidance as Chairman, it was agreed that Mrs Stowell should become Honorary President of the Group.

Electronics Group

Programmes for the Seventh Annual Conference of the Group, from 9th to 11th July, are now available. Since the announcement of papers in the April issue of *Aslib Proceedings* a further paper has been added, 'A survey of developments in information retrieval', by Mr J. Becker, who is a consultant in information retrieval and a lecturer in library studies at the Catholic University, Washington, D.C. Copies of the programme have been sent to all members of the Electronics Group and the closing date for applications is 14th June 1965. Other members of Aslib will be very welcome and anyone who is interested can obtain the programme and forms of application from Mr R. S. Lawrie, Chief Librarian, Sperry Gyroscope Company Ltd, Bracknell, Berkshire.

ACSP Survey of Information Needs of Physicists and Chemists

Readers may have noted at intervals during the past two years references in Parliament and elsewhere to a survey being made, on behalf of the Advisory Council on Scientific Policy, of the information needs of physicists and chemists. Extended reference was also made to the survey, with which the name of Professor B. H. Flowers is associated, in the most recent annual report of the ACSP.

The report of this survey has now been prepared by DSIR for publication in the *Journal of Documentation,* where it will appear in the June 1965 issue. In the same issue will be printed a paper, communicated by Dr D. J. Urquhart—'Physics abstracting: use and users'—based mainly upon the results of investigations of sources of references to publications requested from the National Lending Library. These two papers, together with an earlier report 'Literature searching by research scientists' (J. Martyn, Aslib, 1964), share much common ground, and a review article assessing the significance of the results contained in them, and in some other relevant work, has been prepared by R. M. Fishenden for publication in the September 1965 issue of the *Journal of Documentation.*

Does your Firm Need its own Information Service?

The latest language version of this booklet to be received at Aslib headquarters comes from Yugoslavia. The booklet has previously been published also in French and Finnish. The original English version, which has been reprinted several times, was prepared by the Aslib Research Department for the Organisation for Economic Co-operation and Development (OEDC) in 1962. Copies are obtainable from HMSO at 5*s*.

A Visit to the Port of London Authority

The Port of London Authority has most generously offered hospitality for a party of eighty Aslib members to spend a day on the river, lunching on board the s.y. *St Katherine* and making a tour of the port, on 20th July.

Tickets for this trip will be issued strictly in order of receipt of applications, and it will not be possible to arrange a second visit this year.

Application forms are being distributed with this issue. Written or telephone bookings will be accepted by the Meetings Organizer, Aslib, 3 Belgrave Square SW1.

Scottish Summer School

The Scottish Summer School of Librarianship will be held again at Newbattle Abbey, near Dalkeith, from 3rd to 9th July. The inaugural address will be given by Sir Frank Francis, and there is a varied programme, including lectures by Mr B. I. Palmer on 'A time of change', Mr C. W. Black on 'The origin of books', and Mr R. Hindson on 'The functions of the industrial library'. One of the visits planned will be to Alex. Cowan's Paper Mills. The full fee, including residence, is £7 10*s*; applications, giving name, address and library, should be sent to Mr J. W. Cockburn, Central Public Library, George IV Bridge, Edinburgh 1, together with a registration fee of £1 (which will afterwards be deducted from the full fee).

Agricultural Librarians Congress

IAALD (the International Association of Agricultural Librarians and Documentalists) has announced the Third World Congress of Agricultural Librarians and Documentalists for 3rd to 9th October 1965 in Washington. It will be residential. The timing will enable members who intend joining the FID Congress (from 10th to 16th October) to go on to this; alternatively there will be an opportunity to take part in a field tour of American agricultural libraries. The papers to be given will evaluate new techniques, mechanization, co-operation and training for agricultural libraries and documentation centres. Programmes may be obtained from the Executive Secretary, Third World Congress of Agricultural Librarians and Documentalists, c/o National Agricultural Library, US Department of Agriculture, Washington, DC 20250, USA.

Thesaurus of Engineering Terms

Members will be interested to know, in reading Mr Holm's paper in this issue, that the *Thesaurus of Engineering Terms* which he describes in detail on p. 152 is now available for purchase in the United Kingdom, by arrangement between the Engineers Joint Council in the United States and the Cement and Concrete Association in this country. The Thesaurus, which is envisaged as a standard work of reference, is 300 pages long and can be ordered from the Cement and Concrete Association, 52 Grosvenor Gardens, London SW1 (price 70*s* including postage and packing).

British Standards: Language Symbols

In dictionaries, glossaries, translations and similar publications it is often necessary to indicate, briefly, the language a term or document belongs to, the country or geographical area a term is used in, or the authoritative source of a term or definition. A British Standard, BS.3862, has now been prepared to provide *Recommendations for symbols for languages, geographical areas and authorities.*

This contains a table of symbols for thirty-eight languages, including Afrikaans, Croat and Urdu as well as more familiar ones. Geographical symbols are given for some 130 countries and geographical areas.

Copies of BS.3862 may be obtained from the BSI Sales Branch, 2 Park Street, London W1 (price 6*s*; postage extra to non-subscribers).

Western Reserve University Scholarships

A grant of $5,000 from the Edwin W. Rice, Jr, Fund of the General Electric Foundation has been received by the Western Reserve University School of Library Science for scholarships for advanced students specializing in the areas of documentation and information science. These awards will be made for the academic year 1965–6. Inquiries regarding scholarships should be addressed to the Dean, School of Library Science, Western Reserve University, Cleveland 44106, USA.

Vacancies in Libraries

Mr D. H. Revill is acting as Careers Officer for the Leeds School of Librarianship. Librarians are invited to send full information concerning any vacancies so that the suitability of a student for a particular post can be assessed, and practical guidance and advice given. Particulars should be sent to Mr D. H. Revill, Leeds College of Commerce, 43 Woodhouse Lane, Leeds 2.

Mathematics Collection

An offer has been received from Mr G. T. Watson of mathematical books and journals available for purchase. These form a collection left by his father, the late Professor G. N. Watson. The items are being offered separately, and the ones immediately available are the following complete or partial runs:

> *Cambridge Philosophical Society Proceedings*; *Cambridge Philosophical Transactions*; *Messenger of Mathematics*; *Quarterly Journal of Mathematics*; *Fortschritte der Mathematik*; *Encyklopädie der Mathematischen Wissenschaften*; *Mathematika*; *Proceedings of the Edinburgh Mathematical Society*; *Proceedings* and *Journal* of the Glasgow Mathematical Association: *Journal of the Indian Mathematical Society*; *Mathematics Student* (Indian Mathematical Society).

Members who are interested should write for further details to Mr Watson at 46 Warwick New Road, Leamington Spa, Warwickshire, by 4th June.

One-day Conference on Statistics

Arrangements are being made for a one-day conference between statisticians and librarians, at which statisticians can discuss what they need from libraries, and librarians can discuss how best to serve statisticians. The conference is being sponsored by the Library Association and the Royal Statistical Society and will be held on Monday 5th July, at Chaucer House, Malet Place, London WC1. The chair will be taken by Professor R. G. D. Allen, C.B.E. The conference fee is 30*s* and programmes and preprints will be issued during the week of 14th June. Anyone interested in attending may obtain details from the Secretary of the Library Association at the above address.

TECHNIQUES AND TRENDS IN EFFECTIVE UTILIZATION OF ENGINEERING INFORMATION*

B. E. HOLM

E. I. du Pont de Nemours & Co., Inc., Secretary's Department, Information Systems Division, Wilmington, Delaware

Imperial College, London, 2nd July 1964

INTRODUCTION

THE Institution of Chemical Engineers sponsored this series of lectures on the information programmes of the American Institute of Chemical Engineers, the Engineers Joint Council, and other organizations of interest to those in science and technology. The Institution has been interested in these developments and wants to assess what role it should play in the processing of technical information. From the trends of these organizations and from the developments in equipment and microforms patterns are emerging which will help the information officer in his work.

This paper will discuss the flow of technical information and current and expected future developments in its management and put the developments in the United States in perspective. The intelligent management of our technical information is one of the cornerstones in effective progress as an individual, an organization, and a nation.

TECHNICAL INFORMATION FLOW

The late President John F. Kennedy signed the introduction to a report issued by his Science Advisory Committee on *Science, government, and information*. The report demonstrated the national and international interest in the information sciences. The statement said in part 'one of the major opportunities for enhancing the effectiveness of our national scientific and technical effort and the efficiency of government management of research and development lies in the improvement of our ability to communicate information about current research efforts and the results of past efforts'. 'Strong science and technology is a national necessity and adequate communication is a prerequisite for strong science and technology.'[28] The following remarks will be restricted to the area of scientific and technical data and information. Although there is a continuum from the processing of inventory data to the concept of image processing, these latter areas are now considered to be in the region of information systems and this is the field to be discussed.

Technical information flow follows the following steps: generation, organization, dissemination, storage, manipulation, and retrieval. A technical society plays an important role in some of these phases now. A technical society can plan an important role in all of these phases if it wishes to assist its membership in information handling. Information officers are concerned with all of these areas.

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* Published through the kind agreement of the Institution of Chemical Engineers.

Generation

There are many studies characterizing the volume of information being generated today. Some consider this critical; others do not. However, there are certain facts which do seem significant. The current public and private research and development expenditures in the United States are about $18 billion a year. The public and private research and development expenditures in Great Britain were £634 million in 1962. One of the major products of this research is new information. Derek Price has told us that technical information generation has been doubling in every ten- to fifteen-year period since 1750. He estimates that two million scientific and technical articles have been published a year and by 1975 some three million articles a year will be published. In addition, there is the vast written but unpublished technology that is also of concern. We are told that about 90 per cent of all the scientists that have ever lived are alive at the present time. Many of them are busy generating new information. The same applies to engineers.

None of this is new. In Ecclesiastes xii. 12 is written 'Of making many books there is no end, and much study is a weariness of the flesh'. Perhaps the answer to this can also be found in Ecclesiastes, this time i. 18, 'For in much wisdom is much grief: and he that increaseth knowledge increaseth sorrow'.

Another interesting quotation comes from the *Ramayana*, the poem on the life of Gautama Buddha, which says, 'They showed me a catalogue of their writings, which already runs to a roomful of scrolls. It is not complete and never will be, for dissertations are produced more quickly than they can be listed, since the cataloguers are themselves writing dissertations on the proper principles of listing dissertations.'

The volume of information is large and is increasing. We hope that it is new and significant information. Therefore another consideration along with quantity is quality. The purposes of publishing are to organize and disseminate by bringing to the attention of others significant new scientific developments and to provide a permanent record of these developments.

Organization

Organization of information is the primary responsibility of the engineer creating the record. However, the technical society can play a part by insisting that all material presented at technical meetings and accepted for publication be organized for conciseness and understandability.

Dissemination

Technical societies play a major role in the dissemination of information. Most societies hold technical meetings for the presentation and exchange of new developments. Societies publish technical journals. One consideration is whether these forms of dissemination are adequate and rapid enough for today's needs.

Storage

Information is stored in libraries on bookshelves, in basements, on tables, in corners of offices, and now machines are being used to store this material. The greatest improvement in our storage problems can be made by screening the material initially and only keeping that which has probable future value. Contributions can be made to the volume problem by first discouraging the dissemination of insignificant information and second by refraining from storing it for future use.

Manipulation

There will be an increasing need for information manipulation by the information system. Consider this display (Figure 1). Today's modern retrieval systems are usually those which store references to information rather than the information itself. After retrieval the desired portions are extracted and manipulated externally by either the user or someone assisting the user. The next level of systems are those which answer questions directly. There is work under way on systems which store ordered data or ordered information. Questions posed to these mechanized systems are provided with answers through manipulation by the system of the material. Examples of the kinds of questions these systems can answer are as follows. 'Calculate the correlation between property A and property B for certain test samples between selected dates.' This can be done with data systems storing ordered data. Systems with ordered information can answer questions such as the following. 'What

INFORMATION SYSTEMS CONTINUUM

REFERENCE SYSTEMS	CLASSIFICATION SYSTEMS CONCEPT COORDINATION
QUESTION ANSWERING	ORDERED DATA ORDERED INFORMATION FREE TEXT
ARTIFICIAL INTELLIGENCE	PROBLEM SOLVING SYSTEMS GENERATING NEW INFORMATION FROM OLD SIMULATION OF THINKING

FIGURE 1

cricket teams won ten matches in 1963?' The search programme would seek out relevant information and manipulate it to produce a logical answer according to a pre-established pattern. As you might expect, the name of this system is Baseball. These systems, and the ones that follow, would not be possible without a new method for storing information in computer memories called list processing.[10]

The next major development under way is the answering of questions directly from stored free text. SAD SAM is a programme which does answer questions from free text on a limited scale. This system is described in terms of a 'sentence appraiser and diagrammer' (SAD) which organizes words into their syntactic relations, and a 'semantic analysing machine' (SAM) which extracts and stores semantic meaning.[18] From here the continuum covers artificial intelligence systems. These are the problem solvers, systems which generate new information from combinations of old information, and finally those systems which simulate human thinking. Papers have been written on the theory, and early research is being done to learn how a computer can be programmed to solve these problems. Work is being done by Solomonoff on inductive inference. Work has been under way for a number of years by Rosenblatt on the Perceptron. The latter four areas are interesting research efforts. To date no practical operating systems exist beyond experimental research programmes.[21, 26, 30]

The significant aspect is that there is a potential continuum of systems which can be applied. Today we have the ability to establish reference systems and question-answering systems up through ordered information. In the future we will have the ability to handle some of the more sophisticated requirements. If a list of references is satisfactory for the user the reference system is adequate. It is the least expensive. If a major amount of manipulation of the extracted data or information is required, and these manipulations can be predicted, then a question-answering system should be established if ordered data or ordered information is available. However, there are and will continue to be instances when even more sophisticated approaches are necessary and thus we must study and review the research work in this field.

Retrieval

Are we able to retrieve information from the volume of information available? There are quite conflicting opinions in this regard. For example, Bar-Hillel has said 'the geometrical rate of increase in scientific and technological publications raises no particular problems, does not create any particular threatening situations, and does not require crash programmes. Its increase is commensurate with the increase in scientific and technological manpower and is, in fact, nothing more than its direct result. The feeling of an impending crisis, widespread even among competent scientists, is due to propaganda by vested interests.'[3] Ralph Shaw has said 'in view of the fact that vast amounts of information are now available and readily retrievable through various devices, the outcries we have been hearing about the alleged crises in information retrieval seem to be somewhat extreme'.[29] However, equally weighty sources take a somewhat different view of the situation. The

Ford Foundation has said 'the twentieth century explosion in knowledge has brought the libraries of the world to the bursting point, and librarians and scholars to near despair. Coupled with the exponential increase in publications is an increasing demand for access to sections of books and periodicals, even paragraphs, where vital information may be stored. Scientists and engineers in particular are haunted by the fear that they are working on problems whose solutions have already been found published elsewhere.'[2] Most authorities conclude there is a problem.

Consider how much time a person can afford to spend in searching the literature. One study suggests that the individual theoretical researcher will, on the average, maximize his overall productivity if he spends half of his time trying to create new information and half of his time digesting other work and communicating his own.[28] This then would suggest that there is an upper limit of time available to devote to literature searches. We must help the individual use this time effectively.

Another consideration is that science and technology can flourish only if scientists interact with their colleagues and each branch of science interacts with other branches. Information must remain unified if it is to be effective. As the volume of literature increases the basic scientist imperceptibly narrows his interests to those matters on which he can keep informed. He does not consider that he has an information problem. This narrowing of a scientist's area of interest can be dangerous. Science is really indivisible. Fragmenting it into a host of unconnected specialties, each specialty narrowing, with the number of specialties increasing, weakens science as an instrument for probing knowledge. Modern science and technology tend to be more and more interconnected. Successful pursuit of a narrow specialty requires effective contact with more and more diverse parts of the literature.[28]

An individual's need for information varies, depending upon who he is and what he does. The student, the professor, the research engineer, the new engineer in industry, the engineering consultant, and the engineering administrator all have differing information requirements. Often senior engineers build up effective communication networks among themselves on a personal, informal basis. These people might not consider that they have an information problem. If they are eminent in their field new information is brought to them for their evaluation. In many cases it is true that they know all that they need to know about their particular field. But consider the new engineer in industry who does not have these contacts. He needs help with information flow.

Consider the administrator. He asks a technical question. When the answer comes back rapidly he considers that the information is under control. He may not know that the entire organization was disrupted for days. Consider the process engineer on a plant. When a crisis arises where does he get the answers to help him with his problem?

Engineers' requirements for information will vary, depending upon whether they are in basic research, applied research, design, construction, production, or marketing. Their requirements will depend upon their experience, the kind of organization in which they are located, and whether the field that they work in remains the same or whether they are often assigned to new areas.

The following points summarize this view of the current status of technical information flow:

1. The pace of science and technology is increasing.
2. There are no mutually independent divisions of science and technology.
3. The volume of published information is increasing.
4. The quality of published information should be improved.
5. Information requirements depend upon the individual's experience and his function.
6. New methods are needed to help the information processing of scientists and engineers; first to stimulate their minds for the creation of new ideas, and to assist them in meeting their particular specific information gathering needs.

CURRENT DEVELOPMENTS IN INFORMATION PROCESSING

First, there is a distinction between data and information.

Data are numeric or quantitative notations. Data concepts are mutually exclusive. Data are easily manipulated by machines. The boiling point of lead is 1620°C. That is data.

Information is knowledge concerned principally with qualitative concepts or ideas. Information concepts are not mutually exclusive.

The concepts interact and overlap. Information is not as easily manipulated by machines as data. Information includes data. A qualitative discussion of ablation of plastics in heat shields of space vehicles would be information. Data are relatively easy to handle. Information is difficult.

Items are records, such as reports, abstracts, articles, books, and other documents. Items can be stored in the system or the references to the items may be stored. Although there is much talk about information retrieval, in most cases what is meant is the retrieval of references to items. Information is supplied to the inquirer in the form of a collection of items or documents and then the recipient selects the information from them.

Terms are used to represent concepts. In various systems they may be called descriptors, key words, uniterms, subject headings, and facets. There are subtle differences between these but the word 'terms' will be used to cover all of these. Terms are stored as references to information.

Publication improvements

The dissemination of written technical information has traditionally utilized two physical forms of documents: serials and separates. Serials include technical journals and separates include books and bound reports. Both of these forms are aimed at disseminating current information and providing a permanent record. These are primary sources. Secondary sources, such as abstract journals, are used for retrospective searches. Major improvements in primary publications have been through faster publication. In many fields published information covers work started three to five years previously. Although societies and publishers cannot speed up the completion of research, they can disseminate results promptly. The American Institute of Physics, for example, mails its major journals four and a half to six months after receipt of articles.

Express journals are mailed out within four to five weeks of the receipt of the articles. The primary journals are including more meaningful titles and more informative abstracts.

Improvements are being made to the secondary publications, the abstract journals. There is major emphasis on speed of issue. *Chemical Titles*, a journal published by the American Chemical Society, is computer produced to give an alphabetical title listing according to the significant words, with the title reproduced as many times as there are significant words contained. These are the increasingly popular permuted indexes. Express journals are published of the table of contents of magazines in various fields. Often these express journals are published before the journals referenced.

Source indexing

It is no longer practical for every recipient of a technical article, be it an individual or an organization, to index and abstract that article for their own use. A better balance of effort is needed among authors, publishers, and information centres. The generators of information should provide with that information the access to it. Many primary journals are including these indexes and abstracts along with their technical articles. This is one of the major features of the programme of the American Institute of Chemical Engineers. Many individuals and companies are indexing only the most pertinent and re-usable internal information. Appropriate access to outside literature is becoming possible by using the indexing provided by the generating source. This requires that the source produce the material in a form usable by the many recipients.

Deeper indexing

In the past items have been referenced by perhaps six terms. However, as our technology becomes more detailed, inquiries become more specific There has emerged a need for, and a tendency toward, deeper indexing. Some systems index an item, such as a patent, by perhaps two hundred terms. Consider for a moment that back in 1938, in Du Pont, a document could be indexed by the single term 'nylon'. If you ask for all documents on 'nylon' today you would receive back more items than you could read in a lifetime. Thus we must index more deeply. We must be more specific.

Concept co-ordination

Most newer systems installed today in industry and in government in the United States are based upon the principle of concept co-ordination. In the example shown (Figure 2) the report, arbitrarily numbered 100, discusses the ablation of plastics in heat shields of space vehicles and four concepts are selected as indexing terms. In the form of concept co-ordination shown here references to information are stored by indicating for each concept the identification number of items that have information on the concept.

References to information are retrieved by co-ordinating the terms on which the searcher desires to find information, then noting matching item numbers on those terms. A searcher interested in ablation of plastics in heat shields

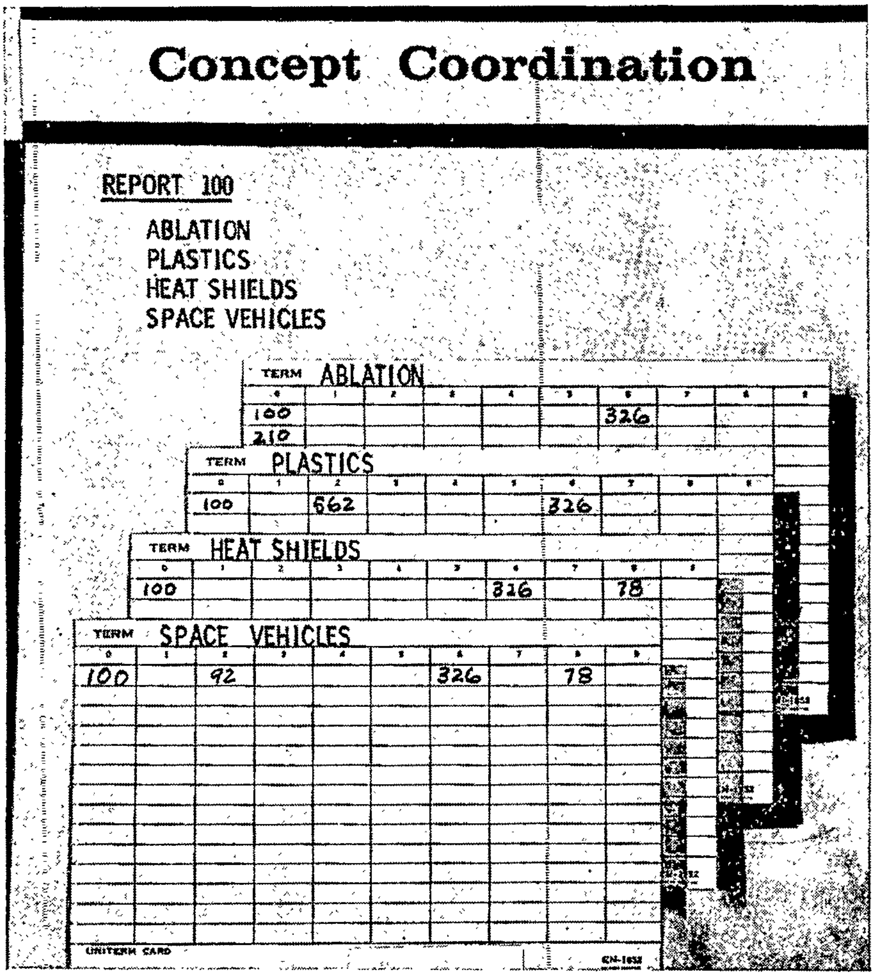


FIGURE 2

of space vehicles would upon co-ordinating those terms retrieve items 100 and 326 and any others previously indexed for these same terms. In addition, a searcher interested only in heat shields for space vehicles would upon co-ordinating just those two terms retrieve not only items 100 and 326 but item 78 as well.

Vocabulary control

Major efforts for the organization of language are under way to improve the communication process. Various forms and applications of a thesaurus have been used as efficient means for vocabulary control. This is one type of tabular display of information relationships. (See diagram at top of p. 143.) A form of graphic display is found in the interesting thesaurus produced by the European Atomic Energy Community (Figure 3). Some function of this type is a necessity in an effective information system.

Technical responsibility

As information systems become larger and our information requirements more comprehensive these functions are being manned by individuals who have capabilities as both subject specialists and information handling specialists. Many colleges and universities are offering a curriculum in information processing with science or technology as a prerequisite in order to provide trained personnel for this field.

Specialized centres

Because of the volume of information, many organizations only attempt to maintain an efficient system for their internal documents. There are many specialized centres available for use by those who wish to search a specific discipline in depth. The National Science Foundation has published a listing of 427 specialized science information services in the United States available for this type of inquiry.[31]

Demand storage

Traditionally, libraries and record centres maintain copies of items and circulate them upon request. This is called a *circulating* collection. A newer approach is emerging in which the documents do not circulate. Instead, upon demand, the copy of the original is furnished to the inquirer. Thus the original never circulates and the copy furnished to the requester is either kept or thrown away. This protects the physical condition of the original and assures that it is less apt to be lost. The advent of low-cost copying equipment has made this possible where the cost of the copy is less than the cost of circulating the item and keeping records about it.[11] This is called the *demand* library. The approach is being used more and more and in a few years will supply the majority of information requests.

Service

More attention is being paid to the provision of information as a service in contrast to an often occurring philosophy of information as a record storage activity. We are paying more attention to active dissemination of information rather than passive interment in repositories where the resurrection of information may require great initiative and ingenuity on the part of the individual. Service over-rides system. An information function must be attuned to the varying and changing information needs of those who can use it, and available to provide information when needed, quickly, completely, and economically. Better service will increase the use of information. Increased use of information should improve our engineering functions.

Thesaurus

- **DISTILLATION**
  - **(SYNONYMS)**
    - **FRACTIONATION**
    - **RECTIFICATION (CHEMICAL)**
- **METALS**
  - **(INCLUDES)**
    - **COPPER**
    - **IRON**
    - **LEAD**
    - **STAINLESS STEELS**
    - **TIN**
- **FURNACES**
  - **(RELATED TERMS)**
    - **BURNERS**
    - **CALCINERS**
    - **HEATERS**
    - **KILNS**
    - **OVENS**
    - **ROASTERS**

EURATOM THESAURUS

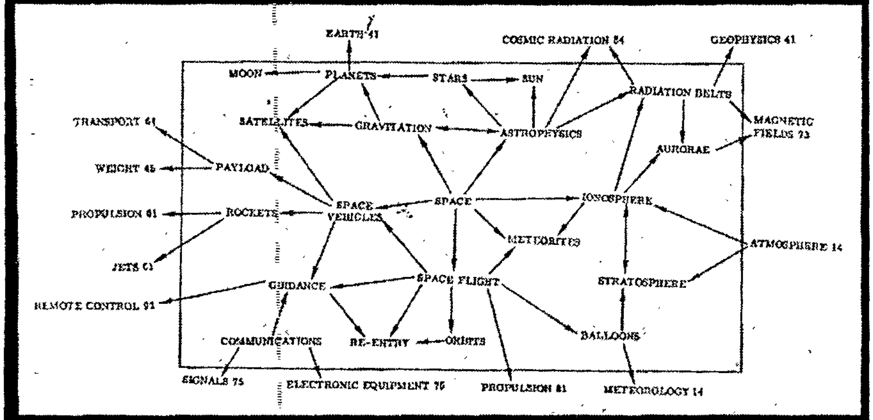


FIGURE 3

Information networks

There are two approaches to the management of this large information flow. One would be to manage this in a large national collection. This does not seem to be a very common approach. Even the Soviet Union upon close examination appears to be decentralized. The collecting, abstracting, and disseminating of world literature in the natural and engineering sciences is done centrally in the All-Union Institute of Scientific and Technical Information. Since 1953 this agency has been abstracting the world's literature. It is organized into at least forty abstract journals and has a permanent staff of 2,500. The contact with the researcher is through four thousand local organizations called ONTIs, established at each major institute and plant. In addition there are other national, republic, and regional facilities making up a decentralized network. This is described in the June 1964 issue of *International Science and Technology*.[17]

In the United States a series of congressional committees have studied the flow of scientific and technical information. The concensus of these and other studies is that there are adequate separate agencies already in existence and that the government's role should be to stimulate and encourage the improvement of already existing services.

PROGRAMME OF AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

The American Institute of Chemical Engineers has had a pioneering role in the introduction of new information processing concepts in the engineering field in the United States. The Institute considers one of its primary functions to be the presentation, dissemination, and exchange of important engineering ideas. The Institute has introduced innovations in this area, including the establishment of a computer programme exchange, the publishing of indexes and abstracts for technical articles, and publishing of the *Chemical Engineering Thesaurus*.

The chemical processing industry in the United States has been characterized over the past twenty-five years by a steady growth rate. Chemical engineering literature has also had a rapid increase in volume over the years. The chemical processing industry has been aware that effective use of information would improve research and enable companies to get products on the market faster than the competition. In one extensive bibliography there are 197 references on systems in the chemical industry which use mechanized searching for chemical information.[19] It is also interesting to note that over 60 per cent of the systems listed in *Nonconventional technical information systems in current use* published by the National Science Foundation are in fields of chemistry or biochemistry.[23] Chemists and chemical engineers need and use information.

The Institute knew that publishing and technical meetings alone do not serve the total information needs of its membership. In 1961 a committee supported by the National Science Foundation determined the Dynamic Objectives for Chemical Engineering. Improved information utilization was included among the objectives from this study.

Computer programme exchange

The chemical process industries needed some form of co-operative effort to make available computer programmes which would be useful to chemical engineers. The Machine Computation Committee convinced the editor of *Chemical Engineering Progress* that published abstracts of computer programmes would be a valuable service. These abstracts covered computer programmes for which the company would be willing to prepare and release full computer manuals. To date over one hundred of these abstracts have been published. Where there is sufficient interest the Institute has published a complete programme manual. So far fifteen of these programme manuals have been prepared and over 540 copies have been sold.

Another effort of the Machine Computation Committee is a project which is under way to review and select the best methods for calculating physical properties from fundamental data. Computer routines are being written for calculation and checking. This is a two-year project for over $200,000 supported by industry and the National Bureau of Standards, performed by outside consultants, and under the direction of AIChE. When this project is completed it could serve the physical properties data requirements of many organizations for many years in the future.

In another related effort AIChE has published and offers for $2 a programmed instruction manual on Analog Computation.

Information retrieval programme

Up to 1959 the Institute had received many requests from chemical engineers for help with the organization of their information. Letters to the editors and comments at technical meetings indicated that here was a problem requiring action by the profession. A committee was formed and a course of action was planned.

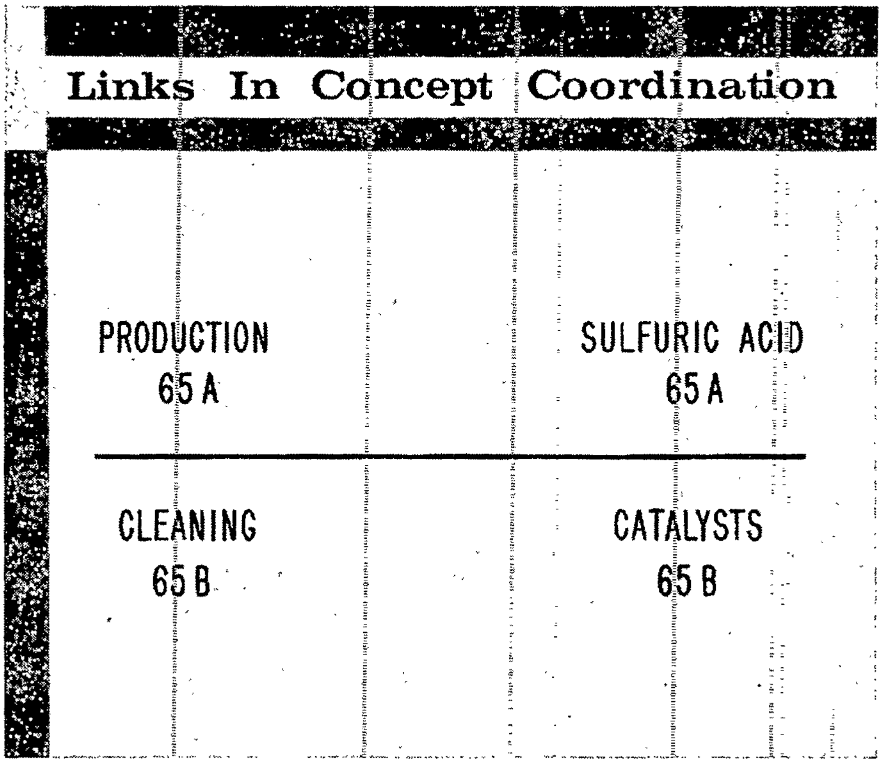
Source indexing

Chemical engineers had stated that they needed help in storing their literature references so that these references could be found when needed in the future. It was evident that many engineers were duplicating the effort of indexing articles. In addition, many did not know the best methods. The committee decided that the Institute could render an important service by providing indexes to a technical article with published articles. Thus all the recipients of the literature would be able to store and retrieve information from chemical engineering publications with a minimum of effort. The author's knowledge of the article and the editor's analysis of it could be put to effective use through their spending a little additional effort before publication. This small added work on the part of the author and editor would save a far larger amount of time on the part of all future users of the published references.

The committee analysed the various information retrieval systems in use and under development. Without going through the details of the analysis the committee concluded that concept co-ordination best served the needs of chemical engineers. For a system of this type the user would not be required to understand an extensive classification, he could index as deeply as necessary, and the system was sufficiently open-ended so that new concepts could easily be added.

Links

A system of links and role indicators was developed to make the system work more effectively. Links prevent retrieving documents not pertinent to the question. As is well known, links connect the terms in a document that go together. A document discussing the subjects of 'production of sulfuric acid' and 'cleaning of catalysts' would have two links, link A on 'production of sulfuric acid' and link B on the 'cleaning of catalysts'. It is not possible to co-ordinate 'production' and 'catalysts', because the item numbers and link letters must agree.



Role indicators

A system of role indicators was developed to differentiate between 'Mylar' used for packaging and packaging of 'Mylar' film. The functions of terms are identified by using role indicators which express the relationship of each term to each other. AIChE developed a system of ten numerical role indicators for expressing the notion. The Institute made a few minor conversions and adopted the Engineers Joint Council role system.

ROLE INDICATORS

PACKAGING OF "MYLAR"

PACKAGING (8)	"MYLAR" (9)

"MYLAR" FOR PACKAGING

"MYLAR" (8)	PACKAGING (4)

ENGINEERS JOINT COUNCIL

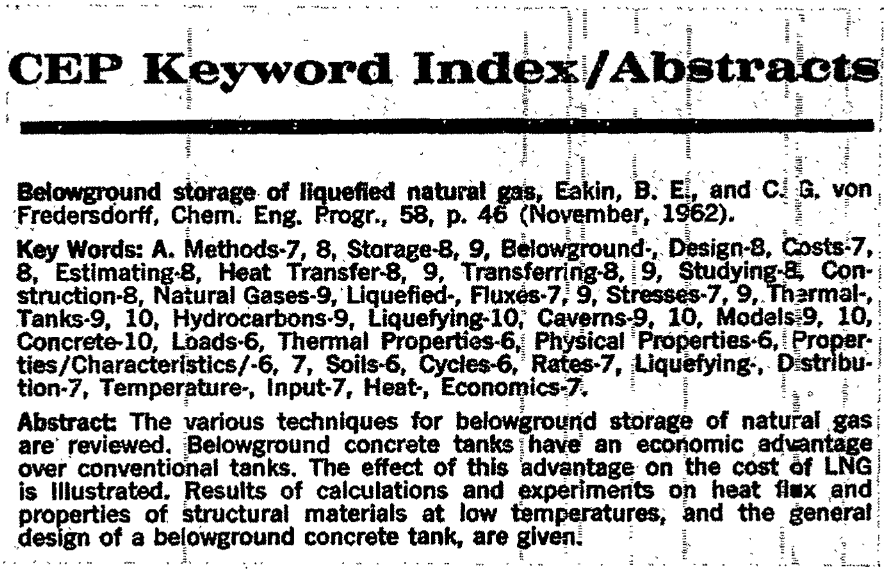
MEANING OF ROLES

8	SUBJECT
1	INPUT
2	PRODUCT
3	WASTE
4	USED FOR
5	ENVIRONMENT
6	CAUSE
7	EFFECT
9	PASSIVELY RECEIVING
10	MEANS TO ACCOMPLISH
0	BIBLIOGRAPHIC DATA, ADJECTIVES

Programme details

The committee knew that some individuals preferred to keep abstracts of the articles rather than the articles themselves. Therefore indicative abstracts were included in the source indexing. Also the bibliographic reference was added.

The first step was to train the editors of *Chemical Engineering Progress*. The next step was to have two articles published in the May and June 1961 issues of *Chemical Engineering Progress*. The first article gave the background on the development of the system. The second article described how to use the system. Readers were shown that the system could be used by individuals, libraries, and large information systems which might be mechanized. In June 1961 *Chemical Engineering Progress* began to include an indicative abstract and a list of indexing terms with all technical articles of lasting value (Figure 4).



CEP Keyword Index/Abstracts

Belowground storage of liquefied natural gas, Eakin, B. E., and C. G. von Fredersdorff, Chem. Eng. Progr., 58, p. 46 (November, 1962).

Key Words: A. Methods-7, 8, Storage-8, 9, Belowground-, Design-8, Costs-7, 8, Estimating-8, Heat Transfer-8, 9, Transferring-8, 9, Studying-8, Construction-8, Natural Gases-9, Liquefied-, Fluxes-7, 9, Stresses-7, 9, Thermal-, Tanks-9, 10, Hydrocarbons-9, Liquefying-10, Caverns-9, 10, Models-9, 10, Concrete-10, Loads-6, Thermal Properties-6, Physical Properties-6, Properties/Characteristics/-6, 7, Soils-6, Cycles-6, Rates-7, Liquefying-, Distribution-7, Temperature-, Input-7, Heat-, Economics-7.

Abstract: The various techniques for belowground storage of natural gas are reviewed. Belowground concrete tanks have an economic advantage over conventional tanks. The effect of this advantage on the cost of LNG is illustrated. Results of calculations and experiments on heat flux and properties of structural materials at low temperatures, and the general design of a belowground concrete tank, are given.

FIGURE 4

Shortly thereafter this was done in two other AIChE publications, the *AIChE Journal* and *International Chemical Engineering*. Since then two commercial publications in the chemical engineering field, *Hydrocarbon Processing and Petroleum Refiner* and *Chemical Engineering*, have been publishing terms with links and roles for each of their technical articles.

The committee was convinced of the need for a means of vocabulary control. In July of 1961 the *Chemical Engineering Thesaurus* was published. The book is a listing of seven thousand terms. The synonym is given for each term. Both higher and lower class relationships are indicated. A list of commonly associated terms is given. The thesaurus provides the indexer with preferred terminology, suggestions as to additional terms for indexing, and appropriate generic class additions. The thesaurus is also vital in retrieval because it suggests other ways to phrase the question in making an effective search. This increases the probability of finding pertinent articles. The book is now in its third printing.

The latest addition to the services is the sale of 3 in. × 5 in. cards, similar to those shown in Figure 2, so that an individual can set up his own filing system.

The response to the programme was good. Many individuals wrote letters expressing appreciation for action, genuine thanks for the assistance, and acknowledged that individuals and organizations were reorganizing their own information collections along the lines of this approach. A number of worthwhile suggestions came in which were adopted.

Programme evaluation

The National Science Foundation was interested in the impact of this approach on the information habits of chemical engineers. NSF authorized a research study to Herner and Company to determine the kind and extent of usage of the thesaurus and indexes and abstracts in chemical engineering publications.[2] The final report has been submitted and here are some of the results. Extensive questionnaires on use habits were sent to 20,000 out of the 25,000 members of the Institute. Ten per cent of these returned the questionnaire and so a sample of two thousand replies was available for study. The consultant analysed some of those who did not respond, to be sure that the respondent and non-respondent had similar information habits. This turned out to be a correct assumption and so the respondents can be considered as a representative sample of the membership.

Over three hundred of those indicating use of the material were surveyed in depth over the telephone to further characterize their usage of the indexing material.

1. Thirty-four per cent of the AIChE membership makes some use of the indexing materials.
2. Seven per cent of AIChE membership uses the *Chemical Engineering Thesaurus*.
3. Those who do not use this material have a tendency not to be users of any information service.
4. Users tend to be research and process engineers and not predominantly information specialists.
5. The majority of the usage of the indexing material is for current awareness. There is a trend toward more selective reading and reading selected articles completely.
6. Ninety-six per cent of those using the indexing material also had a library or some other information service which they used regularly. This suggests that perhaps one of the reasons that individuals are not setting up personal files is because this service could be provided for them. This would seem to be a point to stress. That is, encourage libraries and organizations to set up files of this type for the use of their engineers.

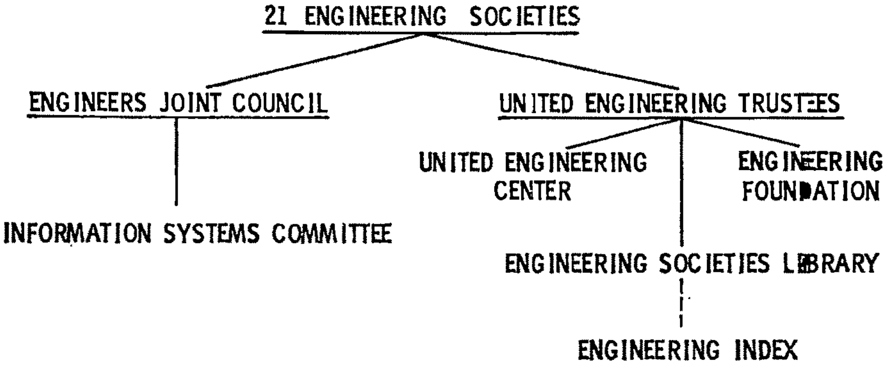
   In another study of a sampling of civil engineers it was found that 20 per cent of their membership was using the indexing materials published to set up personal files. Perhaps a conclusion can be drawn knowing that chemical engineers predominantly belong to large organizations which have information services and civil engineers often belong to small organizations which do not.

7. The AIChE study strongly urged a formal name for the service. It was being called different things by different people and often confusion resulted because of the lack of a formal title.
8. A continuing education programme was stressed for both new and current engineers. This will be started through other articles. They will be at the interest level of the practising engineer. The articles should answer the question 'What can this do for me?'

The results are encouraging. The material is being used. The study suggests new services. Continuing education is required and this will be added. Another study of this type is in order to determine whether the material is being used more with time and whether over time the habits of chemical engineers are changing.

ORGANIZATION OF THE ENGINEERS JOINT COUNCIL

The Engineers Joint Council was conceived in 1941 to serve as a co-ordinating body for engineering functions on an interdisciplinary nature. It began with the five founder societies, The American Society of Civil Engineers, The American Institute of Mining, Metallurgical, and Petroleum Engineers, The American Society of Mechanical Engineers, The American Institute of Chemical Engineers, and what was formerly The American Institute of Electrical Engineers, now The Institute of Electrical and Electronics Engineers. In 1958 EJC was incorporated as a non-profit educational organization. Today EJC provides a co-ordinating function and a professional forum for twenty-one engineering societies in the United States having a combined membership of over half a million engineers.


21 ENGINEERING SOCIETIES
ENGINEERS JOINT COUNCIL
UNITED ENGINEERING TRUSTEES
UNITED ENGINEERING CENTER
ENGINEERING FOUNDATION
INFORMATION SYSTEMS COMMITTEE
ENGINEERING SOCIETIES LIBRARY
ENGINEERING INDEX

ENGINEERING SOCIETIES LIBRARY

The Engineering Societies Library began operation in 1907 and was maintained for many years by four engineering societies. When the United Engineering Center was opened in November 1961 the Engineering Societies Library was included as a necessary part of any engineering facility. It is now supported by twelve societies. Each of these contributes fifty cents per member toward the operation of the library. The library has 180,000 volumes covering all fields of engineering. Over 3,400 periodicals and other serial publications are currently received from fifty countries in over twenty languages. The library reports to the United Engineering Trustees which operates the United Engineering Center. The services of the library include literature searches, translations, reference services, book loans, and photoprints or microfilm copies of articles.

ENGINEERING INDEX

The Engineering Index was started in 1885 to provide comprehensive indexing and abstracting of engineering literature. Although the offices are in the United Engineering Center, it is not connected organizationally with any of the engineering societies.

The Engineering Index offers two major services. The first is the well-known series of bound volumes issued regularly. The second is the Engineering Index card service which is a subscription service in established fields of interest. Subscribers to a division receive their cards weekly. These can be incorporated in an organization's 3 in. × 5 in. library card file. All of the publications indexed are permanently filed in the Engineering Societies Library. Therefore anyone interested in obtaining a copy of an article indexed in Engineering Index can do so through the library.

INFORMATION PROGRAMMES OF EJC

Background

When the various societies, The Engineering Societies Library, and The Engineering Index, all moved into the United Engineering Center in 1961 an information complex was created. The societies were holding technical meetings and disseminating information through the publication of their technical journals. The Engineering Societies Library served as a repository and a reference service covering these journals and others from all over the world. The Engineering Index provided indexes and abstracts for the major portion of these journals as another form of searching service. Thus one would think that an effective, well-functioning information facility existed. However, these capabilities were not being used to the extent that many people believed they should be.

The date on which this course was changed was 17th January 1962. On that day EJC had a symposium on engineering information. It was attended by the officers and staffs of EJC societies and representatives of other major organizations. The key proposal at the symposium was the presentation of a two-part action plan for EJC which was unanimously endorsed the next day by the EJC Board of Directors. The first proposal was for a thesaurus of engineering terms required for assistance in the effective storage and retrieval of technical information. The Engineers Joint Council would undertake the preparation and publication of such a thesaurus if the societies and companies interested in technical information would assist. The second proposal was that the Engineers Joint Council would train society personnel in the indexing and abstracting of technical articles so that a programme of source indexing could be begun.

To implement these proposals the various information committees of the Engineers Joint Council were consolidated into one Information Systems Committee charged with the objectives of encouraging and promoting the development of improved methods for handling information and using machine techniques in the engineering profession. More specifically, the committee was charged with reviewing the adequacy of current and proposed systems for co-ordinating the origin, classification, storage and retrieval, evaluation, dissemination, and uses of information in engineering; to identify problem areas, and recommend measures to gain improvements. Thus, once this co-ordinating function was established, the societies agreed upon a course of direction, and with a chairman to stimulate aggressive action the engineering profession began a programme toward effective information utilization.

Thesaurus of Engineering Terms

EJC's first step was to assist the Defense Documentation Center (ASTIA) on revision of that agency's thesaurus. After that experience EJC was in a position to submit to the National Science Foundation a proposal, which was accepted, for the study of engineering terminology, which would lead to the development of a comprehensive engineering-wide thesaurus. The work was begun during the summer of 1962. The first step was to gather from the societies subject heading lists, classification lists, indexes, and other vocabularies to provide a comprehensive vocabulary pool. About 119,000 terms were contributed by different groups, including the engineering societies, NASA, AEC, The Engineering Index, and The Engineering Societies Library. These terms were keypunched for processing and a master word list was developed. Fourteen thousand terms were selected because they were contributed by two or more sources.

These terms were analysed to resolve ambiguity in meaning, develop and record cross-references, provide explanatory notes and definitions, and establish the necessary relationships. The actual work was done by 131 engineers with backgrounds in each of the fields covered through voluntary effort totalling 130 man-weeks. This fantastic effort was completed in twenty-seven weeks and indicates the interest in the engineering profession in banding together toward the accomplishment of necessary steps toward a major goal.

This phase concluded that there was sufficient overlap of terminology within the engineering profession to develop a thesaurus of interest to the entire discipline. It was decided to go ahead and provide a unified engineering vocabulary. A supplementary proposal was submitted to the National Science Foundation to cover the final editing and converting the result into a punched card format which could be processed and published. The *EJC Thesaurus* was published by the Engineers Joint Council on 1st June 1964.

This thesaurus contains over 10,500 unique terms arranged alphabetically and displayed to show synonymous, hierarchical and other relationships as well as necessary definitions. It can serve the engineering discipline in three ways:

1. To assist an indexer in indexing more fully and at different levels of generality and from different technical viewpoints.
2. To assist the information searcher in phrasing effective inquiries using all the appropriate terms of the engineering vocabulary.
3. To assist writers, editors, and others to express technical information more accurately in accordance with current usage of engineering language.

This is considered to be a research tool and a changing document. As our technology expands and develops, this thesaurus will reflect those changes and will be revised periodically.

Source indexing

In March of 1962, two months after the symposium, EJC offered to its member societies a week-long course in the abstracting and co-ordinate indexing of technical literature. Forty-five society editors and their staffs attended. Demand by many private companies and government agencies for this training convinced EJC that volunteer training could not continue. EJC entered into an agreement with Battelle Memorial Institute to carry on indexing training on a fee basis. The two-year exclusive EJC endorsement of the courses was given to Battelle. Battelle adheres to EJC specifications and has published a comprehensive set of training materials. During 1963 and 1964 about four hundred persons received this training in the United States and Europe.

By 1964 seventeen publications had implemented source indexing services. The American Society of Agricultural Engineers carries out a model programme. In its monthly journal this society provides on a loose separate page abstracts and indexes with links and roles for its conference papers and for articles appearing in that month's issue of *Agricultural Engineering*. An important point is that commercial publications are beginning to see the value of this approach and are adding it as one of their services.

Another significant type of source indexing is being introduced by the Department of Defense. All research contractors are required to submit a final report on their projects. Along with the usual administrative data they are required to give a meaningful title, satisfactory abstract, and are encouraged to provide indexing terms for the report. The assignment of links and roles in a format consistent with the Engineers Joint Council is optional. Thus the concept of source indexing is continuing to extend.

Engineering Index programmes

The Engineering Index received funds from the Engineering Foundation to grant a study to assess the current status of the Engineering Index and to make recommendations for the future. The consultant concluded that the Engineering Index had three major shortcomings:

1. There was insufficient coverage of all significant technical journals and insufficient coverage within those journals of all important articles.

SOURCE INDEXING

TITLE	PUBLISHER
AIChE JOURNAL	AIChE
AGRICULTURAL ENGINEERING	ASAE
ASCE PROCEEDINGS	ASCE
CHEMICAL ENGINEERING	McGRAW HILL
CHEMICAL ENGINEERING PROGRESS	AIChE
CIVIL ENGINEERING	ASCE
ELECTRO-TECHNOLOGY	CONOVER-MAST
INTERNATIONAL CHEMICAL ENGINEERING	AIChE
JOURNAL OF AMERICAN CONCRETE INSTITUTE	ACI
JOURNAL OF PETROLEUM TECHNOLOGY	AIME-SPE
JOURNAL OF PRESTRESSED CONCRETE INSTITUTE	PCI
MATERIALS RESEARCH & STANDARDS	ASTM
MINING ENGINEERING	AIME-SME
PETROLEUM REFINER (COORDINATE INDEX)	GULF PUBLISHING CO.
SOCIETY OF PETROLEUM ENGINEERS JOURNAL	SPE
SYMPOSIUM SERIES	AIChE
THE SAE JOURNAL (COORDINATE INDEX)	SAE

2. There was insufficient indexing through needed cross-referencing of each article.
3. There was a need for a central searching service.

The study made many recommendations on how these deficiencies might be overcome. A plan is under way to test new services in the fields of electronics and plastics engineering. A major improvement is expected to be more detailed multiple access indexing assisted by machine processing techniques.

Engineering Information Center

All of the above tasks are geared toward the eventual creation of an Engineering Information Center. This Center would co-ordinate the dissemination functions of the constituent societies.

The Center would provide current awareness announcements, retrospective searches, and interest profile services. The Engineering Index and the Engineering Societies Library are expected to be the cornerstones of the Information Center. An advisory group consisting of selected user representatives has been established to plan for this function. The first step is to define the user requirements in order to establish the services offered. It is hoped that the Center can be operating by 1968.

Director of Information Services

Committee work and volunteer efforts can make progress only up to a point. EJC has seen the necessity for having a full-time operating staff who can plan and assist in the implementation. The Information Systems Committee can make policy, act as a review board, and be in an advisory function. Therefore EJC has a full-time Director of Information Services to implement this aggressive programme.

EJC has a unique position in the engineering community to bring about widescale improvements. The Federal Government is probably the only other body that could also. Members of government have often stated that unless the technical community takes meaningful action it cannot remain aloof in the problems of technical information handling. EJC has taken up this challenge and has developed the following operating philosophy: 'Technical information provides a valuable resource for the conduct of engineering activities. The ever increasing fund of scientific knowledge and technological innovation is placing new demands on the profession's information handling and dissemination facilities and systems. Furthermore, technology itself is creating new techniques and machinery with more efficient and timely distribution of technical information. Our nation's emphasis and dependence on technological development makes it imperative that the engineering profession fully develop these more efficient methods of information dissemination and that engineers learn to utilize literature resources more effectively.' It is in this spirit that EJC has evolved the specific programmes and will continue to do so.

MAJOR INFORMATION PROGRAMMES IN THE UNITED STATES

A network of information functions is emerging with slow but encouraging co-operation between them (Figure 5).

Information activities of the Federal Government

The Government has a three-part programme. The first is to sponsor research through the National Science Foundation on information flow. Next, the Government operates referral centres. By contacting these centres an inquirer is told where he can find information of the type he requires. Third, the Government establishes information centres covering government information or national information if no adequate service exists. Thus the Government provides those services not logical to one organization or provides those services not available and encourages the improvement of existing services.

Because of this, a network of information functions is emerging. Each centre handles information in its area and a communications network is emerging between centres.

Library of Congress

Of the three great national repositories, the Library of Congress covers published science and technology. The other two are the National Library of Medicine and the National Agricultural Library. The Council on Library Resources made a grant of $100,000 to the Library of Congress for a survey of the possibilities of automating the organization, storage, and retrieval of information in a large research library. Results were released in December 1963. The survey team concluded that the automation of bibliographic processing, catalogue searching, and document retrieval of the intellectual content of books by automatic methods is not now feasible for large collections. A major recommendation was that the Library should request $750,000 to design the system for the automation of the internal operations. The ultimate cost of the implementation of the recommendation was stated as being between $50,000,000 and $70,000,000. The implication from this is that it is obvious that any major revamping of a large existing information function to a new method of operation is admittedly quite expensive. It points out that the only practical approach at present is to begin a new operation in either a new environment or by modifying the future system. It is usually not economical to redo the entire existing collection.

National Science Foundation

The office of Science Information Service of the National Science Foundation is responsible for supporting basic studies in science information handling, assisting in the planning and direction of Federal science information programmes, supporting publications for the dissemination of scientific information, and for disseminating the results of these programmes through a series of publications. The four major ones are as follows:

1. *Scientific Information Notes* is a news publication, issued bi-monthly, giving current activities in the field.
2. *Current Research and Development in Scientific Documentation* reports on research studies.
3. *Nonconventional Technical Information Systems in Current Use* gives the operating detail of contributing systems.
4. *Scientific Information Activities of the Federal Agencies* describes agency programmes.

United States Patent Office

Another large collection of technical information is contained in United States patents. In addition to 3,150,000 US patents, their collection contains an additional five or six million items of related information. Research has been going on in a number of areas for many years to develop methods for improved access to patents. Much of this is centred in the field of chemistry

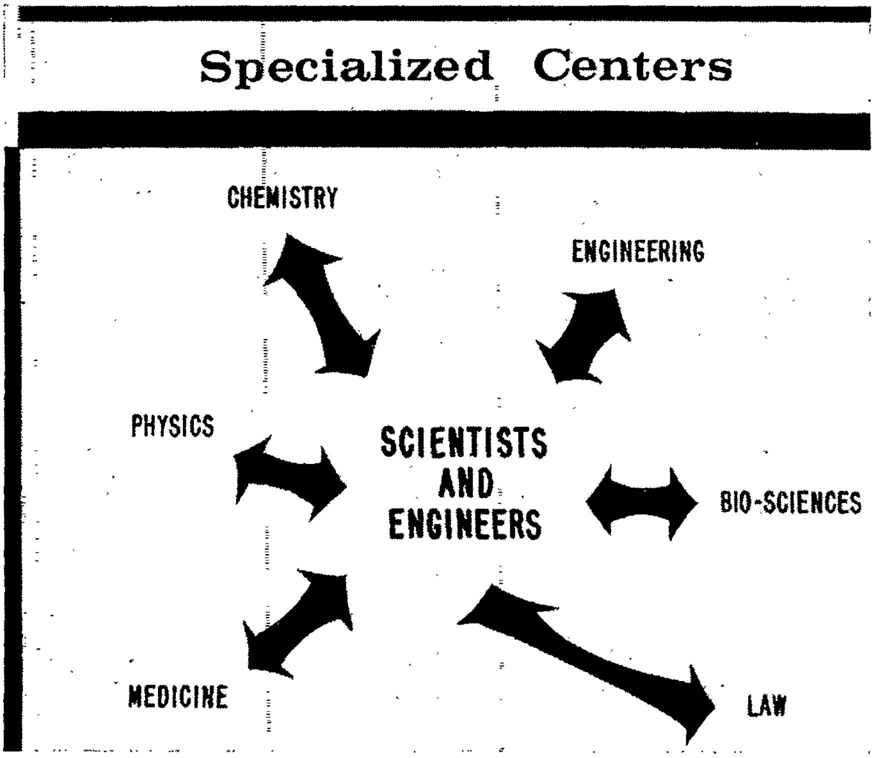
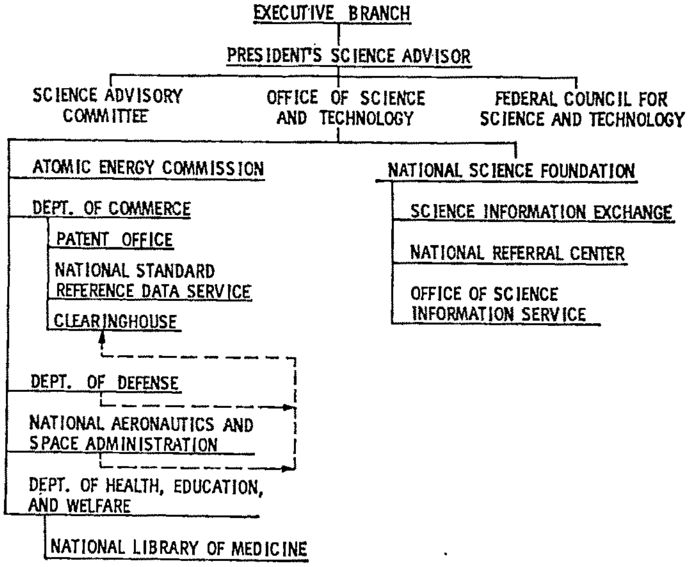

Specialized Centers
CHEMISTRY
ENGINEERING
PHYSICS
SCIENTISTS AND ENGINEERS
BIO-SCIENCES
MEDICINE
LAW

FIGURE 5


EXECUTIVE BRANCH
PRESIDENT'S SCIENCE ADVISOR
SCIENCE ADVISORY COMMITTEE
OFFICE OF SCIENCE AND TECHNOLOGY
FEDERAL COUNCIL FOR SCIENCE AND TECHNOLOGY
ATOMIC ENERGY COMMISSION
DEPT. OF COMMERCE
PATENT OFFICE
NATIONAL STANDARD REFERENCE DATA SERVICE
CLEARINGHOUSE
DEPT. OF DEFENSE
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
DEPT. OF HEALTH, EDUCATION, AND WELFARE
NATIONAL LIBRARY OF MEDICINE
NATIONAL SCIENCE FOUNDATION
SCIENCE INFORMATION EXCHANGE
NATIONAL REFERRAL CENTER
OFFICE OF SCIENCE INFORMATION SERVICE

because the chemical compound is closest to data and thus most easily manipulated by machine. Research programmes have been carried out on steroids, phosphorous compounds, organometallics, and heterocyclic compounds. Test equipment has been developed for them by the National Bureau of Standards. The Patent Office has an intensive programme under way on chemical structure identification through line notation systems.

National Standard Reference Data System

The National Bureau of Standards, in January 1964, announced their responsibility for administering the National Standard Reference Data System. This system will provide critically evaluated data in the physical sciences on a national basis, centralizing a large part of the data compiling activities of government agencies. Standard reference data is defined to mean critically evaluated data on the physical and chemical properties of materials, authoritatively documented as to reliability, accuracy, and source. Types of services that this centre hopes to provide include:

1. Periodical services to keep the user up to date on new data acquisitions in the centre.
2. Subscription services, paid by the user, to receive all available data on a specific subject on a continuing basis.
3. Referral services for specific data requests.
4. Correlation and prediction services for computing values possible in areas where data exist but are not contained specifically.
5. Mathematical and statistical services for evaluating new data.
6. Tabulations, reviews, computer cards, and computer tapes in special areas.

The National Standard Reference Data System hopes to be the focal point for critical data. They expect to consolidate government activities and coordinate their programmes with existing data centres such as the Thermophysical Property Data Center at Purdue University. This was described in *Engineering*, November 1963.

Institute of Applied Technology

The distribution of all unclassified government technical reports is being consolidated in the Institute of Applied Technology in the Department of Commerce. The specific agency is called the Clearinghouse for Science and Technology and has the following functions:

1. Distribution on request of all unclassified reports from the National Aeronautics and Space Agency, Atomic Energy Commission, Defense Documentation Center, and others. These will total 65,000 per year in 1965. Charges will be $1 minimum and $10 maximum per copy. In addition to hardcopy, microfiche and computer tapes will be offered.
2. Starting in 1965, a new announcement bulletin will cover these reports.
3. A 'Who is Doing What' service similar to the Science Information Exchange of the Smithsonian Institute which covers mainly the biosciences.

4. Development of Standards. Progress has already been made with the issuance of government standards on microfiche and descriptive cataloguing. The US Standard in Microfiche is 105 mm. by 148 mm. and contains sixty records (each 8½ in. × 11 in.). This size was selected to conform with the European standard.

There are other programmes but these represent the major ones of interest to those in science and technology. Certain trends are emerging from these activities:

1. More attention and more use is being made of technical information.
2. The Federal agencies are making a sincere and concerted effort to co-operate and to reduce duplication of services.
3. Faster and more complete services are being offered.
4. Each is studying its own information processing responsibilities and is developing aggressive plans for improvement.

As new systems are established they are employing new techniques. Concept co-ordination, occasionally with links and roles, is being used as the storage and retrieval mechanism. Most systems are employing vocabulary control in some form. This seems to be the year of the thesaurus. New dissemination techniques are emerging through current awareness services and express journals. References are manipulated by computers. Answers will be supplied on microforms.

New systems begin with new methods. The large existing systems are faced with the major problem of revising their way of operation. In all cases their improvement will be evolutionary rather than revolutionary.

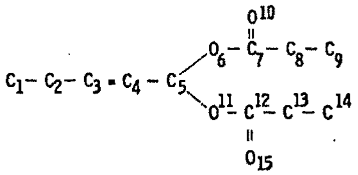
The Council on Library Resources

In addition to the National Science Foundation there is one other major funding organization. The Council on Library Resources was established in 1956, with the help of the Ford Foundation, through a grant of $5 million to be spent over a five-year period to aid in the solution of the problems of libraries generally and research libraries in particular. In 1960 the Ford Foundation approved a new grant of $8 million to enable the Council to continue for an additional seven- to ten-year period its programmes of research and at the same time to concentrate on work in the field of technical storage and retrieval of information through the creation of a laboratory or centre involving the activities of specialized scientific personnel.

Some of the more interesting studies supported by the Council are listed here:

1. Indexing Statute Law by Computer.
2. Indexing Case Law by Computer.
3. Co-ordinate Indexing of Legal Literature.
4. Microform Studies.
5. Automation in Libraries.
6. Automation of the Library of Congress.
7. Mechanization Projects for the National Library of Medicine.

RETRIEVAL NUMBER	ATOM NO.	ATOM CODE	GROUP	BOND 1 TYPE	BOND 1 ATOM NO.	BOND 2 TYPE	BOND 2 ATOM NO.	BOND 3 TYPE	BOND 3 ATOM NO.	BOND 4 TYPE	BOND 4 ATOM NO.
1234567	1	C		1	2						
	2	C		1	3						
	3	C		2	4						
	4	C		1	5						
	5	C		1	6	1	11				
	6	O		1	7						
	7	C		1	8	2	10				
	8	C		1	9						
	9	C									
	10	O									
	11	O		1	12						
	12	C		1	13	2	15				
	13	C		1	14						
	14	C									
	15	O									
	11	C	9								
	4	O	9								
	18	H	9								



O^{10}
$C_1 - C_2 - C_3 = C_4 - C_5$
$O_6 - C_7 - C_8 - C_9$
$O^{11} - C^{12} - C^{13} - C^{14}$
O_{15}

FIGURE 6

CANONICAL FORM

ATOM NO.	ELEM CODE	BOND 1 TYPE	BOND 1 NO.	BOND 2 TYPE	BOND 2 NO.	BOND 3 TYPE	BOND 3 NO.
1	C	2	14	1	6	1	9
2	C	2	15	1	7	1	10
3	C	1	4	1	9	1	10
4	C	2	5	1	3		
5	C	2	4	1	8		
6	C	1	1	1	11		
7	C	1	2	1	12		
8	C	1	5	1	13		
9	O	1	1	1	3		
10	O	1	2	1	3		
11	C	1	6				
12	C	1	7				
13	C	1	8				
14	O	2	1				
15	O	2	2				

COMPACT LIST

ATOM NO.	ELEM CODE	ATOM TO LIST	EOND FRCM. ORIG.
1	C	2	0
2	C	5	1
3	O	6	1
4	O	0	2
5	C	0	1
6	C	7	1
7	C	9	1
8	O	10	1
9	C	11	2
10	C	12	1
11	C	14	1
12	C	15	1
13	O	0	2
14	C	0	1
15	C	0	1

FIGURE 7

The Chemical Abstracts Service

The Chemical Abstracts Service of the American Chemical Society has been operating for fifty-six years. The principal product of this service over the years has been the publication of *Chemical Abstracts*. Its problems have been those of growth, speed of dissemination, and financing.

CAS has a plan for a mechanized chemical information system. This will cover the information contained in 200,000 abstracts per year with information on 75,000 new chemical compounds per year. The file of chemical compounds has grown to 2½ million. CAS plans to store the structural representation of the chemical compounds. The intent is to code each atom in the structure and indicate bonding between the atoms. This will enable a file to be built against which questions on any combination of atoms and bonds can be placed.

Many people have done work on topological coding of chemical compounds. It is possible to take a chemical compound drawn by a chemist and have a clerk code this for entry into a mechanized system (Figure 6). The data on this sheet can be key-punched, checked for errors by the computer, and put into both a canonical form and a compact list for efficient storage. Here is the list for that compound (Figure 7).

Much discussion has arisen over the advantages of notation systems such as Wiswesser, IUPAC, and Hayward (Figure 8). It is possible to input chemical

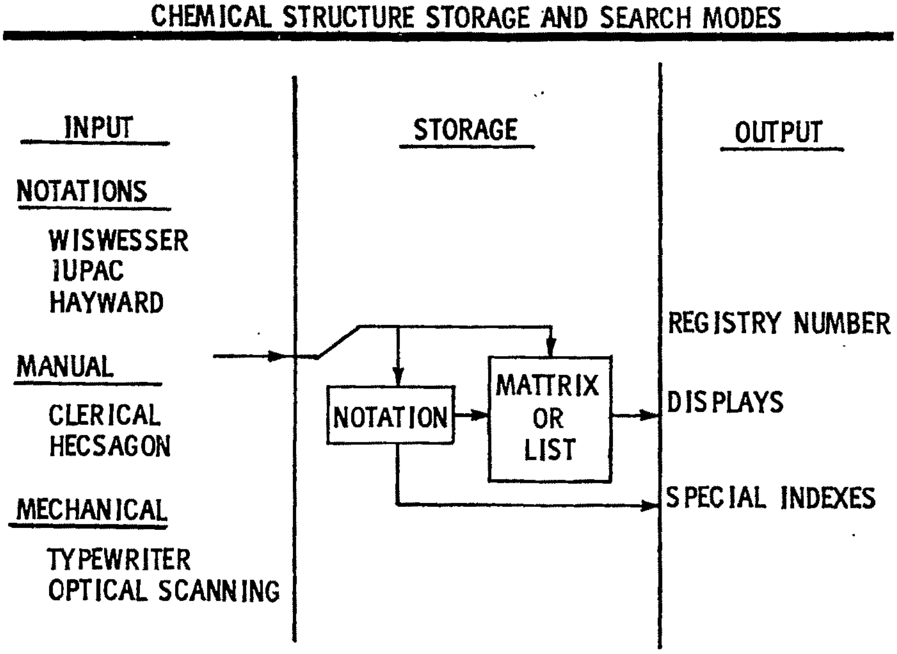


FIGURE 8

structures clerically. Mechanical input is possible through the Walter Reed Army Institute of Research typewriter or through optical scanning. However, the capability exists today to take any of these input forms and transform them into the same representation within computer memory. This is true if the input generates a unique and unambiguous form. A variety of output forms is available, depending upon the requirements of the user. There is no longer a need for a single system. The selection of the input form and the output form depends upon system preferences and economics.

In 1965 CAS plans to begin registering its file of compounds. After registry, computer files will be established to include physical data on the compound, biological activity data, chemical reactivities, process and application information, with complete bibliography connection. The Chemical Abstracts Service plans to operate a mechanized chemical information system through which it will offer a whole new series of services to users. These will take the form of new types of dissemination devices and, of major significance, is its intention to offer machine information searches on request.

American Institute of Physics

The American Institute of Physics has had a documentation research project for a number of years. It has had as its objective the creation of an adequate reference retrieval system for physicists. AIP has kept its books balanced by installing a page charge system back in 1932. It is now $50 per page.

Their study effort has concentrated on research physicists. The first step was to determine the requirements physicists would impose on a retrieval system. An analysis was performed with the help of one thousand research physicists. The study team determined that there were certain common concepts included in all research papers. These are the *properties* of some *object* determined by some *method.* They plan to implement a search system for physics literature. Authors will be asked to help by filling out an indexing form. A current awareness journal will also be offered.

American Society for Metals

The American Society for Metals has had a research project under way for many years at Western Reserve University. It has begun operation of this system itself and is independent of Western Reserve. ASM concludes that its system is still experimental. Usage is not what it had hoped. Its system was based upon semantic coding, telegraphic abstracts, and does include links and roles.

ASM decided that it needs compatibility with other systems. It intends to convert its system to natural language. ASM wants to increase compatibility with the Engineers Joint Council in language, abstracts, system, and machine format. ASM is analysing a new computer which will be required by July 1965. It does not plan to convert its old file but intends to begin indexing in the new format. Industry is being approached for support to cover the services needed.

Industrial programmes

Many industrial concerns are modernizing their handling of technical information. Experiences in Du Pont are typical in many respects.

In 1963 Du Pont spent $58 million for pioneering research. The expenditures for construction of new facilities totalled $370 million. These and other funds indicate the size of the scientific and technical efforts. Much of this work results in the generation of new information and requires use of recorded information.

The Engineering Department has an operating Engineering Information Center. There are about eight thousand deeply indexed reports in the active file. These are indexed using concept co-ordination with links and roles. These reports can be searched either through manual indexes prepared by the computer or, where more complex searches are required, by the computer itself.

A current awareness service is provided by scanning journals and supplying photocopies of articles that meet particular user interests. One person can scan three hundred journals to cover 130 questions in about three hours each day. Major subdivisions of the department have assigned to them technical representatives who serve the information requirements of their groups. These people channel new information into the Engineering Information Center and obtain information for their people. The technical representative has the index available on Engineering Department reports and has established contacts with counterparts in all departments of the company. Most engineering information requirements cannot be answered in the company; they are found outside Du Pont. Therefore 130 separate outside agencies have been used to obtain information pertinent to a particular inquiry.

The Engineering Information Center is typical of many installations throughout Du Pont. Most of our research organizations have similar activities. Other collections have been built up for sales information, marketing information, patents, and process and test data.

The cost of such services varies. It seems that 1 to 2 per cent of a technical effort could well be spent on effective information services so that the results of this technical effort could be used effectively in the future and to assist in finding other information needed by the programme. At least one company in the United States maintains that it spends over 10 per cent of its research budget on information services for the support of its scientific people.

Another requirement is some measurement of the benefits from these functions. Internal analyses have shown that information can be found faster for the scientist or the engineer than he was able to do in the past. In other words, the operation of the system costs less than the time the technical person would spend on his own. In addition, other benefits of faster information services enable more prompt plant start-ups, solutions to plant operating problems, and yield and quality improvements on products.

EQUIPMENT

Sufficient hardware exists today to accomplish any reasonable objective. The use of equipment in this field is big business.

In 1950, in the United States, digital computers for information systems had sales of less than $100 million a year for materials and related services. For 1960 the sales were about $200 million per year. Current forecasts for 1970 for digital computers are about $2 billion per year for information systems work. To put this in perspective, this is about the size of the data processing business today. In addition to the cost of digital storage systems the current market for microreproduction storage, such as microfilm, is estimated at $300 million per year and is growing at the rate of 15 to 20 per cent annually. By 1970 sales here may reach $1 billion per year.

Those of you familiar with equipment have watched it develop over the years. It was not too long ago that the primary access to information was either a library card catalogue or a book index. As punched card data processing equipment became available it was used to mechanize library card systems. The approach was to reproduce the manual systems mechanically. Two modern methods have survived which departed from this approach. These included the optical coincidence principle, originally conceived by Taylor in 1912 and often called Batten cards, and edge-notched cards. These are manual, semi-mechanized methods for storage and search.

Many years ago various types of microstorage were developed with the intent of providing rapid access to physically reduce storage. These early attempts met with limited success because the users did not care for the output form, the retrieval was difficult because of limited indexing, the required auxiliary equipment counterbalanced savings in storage space, and the cost was often too high. From 1930 until the present was a period of many developments. The Rapid Selector was developed in the late 'thirties. Vannevar Bush proposed the Memex in 1945. Western Reserve University built its Searching Selector. The uniterm system was mechanized under the COMAC principle and sold as the IBM 9900 Special Index Analyzer. Throughout this period various storage media have appeared, such as microfilm, microcard, microfiche, and aperture cards. Microfiche is rapidly emerging as the favourite unitized document microform. The ultimate in unit microforms is the one introduced at the New York World's Fair by National Cash Register. On a sheet of microfilm, less than 2 in. square, are contained 1,240 images. Each of these images is a page of the Bible. Thus both the Old and the New Testaments are clearly recorded on one small sheet.

Various systems have been developed such as CRAM, Minicard, Microcite, FLIP, FOSDIC, Filmorex, ILAS, Omnidex, HAYSTAQ, Termatrex, VERAC, CRIS, HRAM, DARE, and DACOM, just to mention a few. These systems are all special-purpose items. The cost ranges from $1,000 to over $1 million. Few of the expensive special-purpose machines have had general acceptance because there has been no general agreement on forms for storage or search system design.

Careful use of equipment can be an asset. Machines can reduce the size of storage through code packing and microstorage.

Machines permit rapid access to shorten the time of search. Machines can update records. Machines have the ability to perform in a single search a number of logical operations. Machines can provide efficient manual indexes.

Many large systems which use computers still perform most of their searches from the manual indexes produced by the same computers. Machines do not solve the intellectual problems of information searching. They can influence the method of finding the solutions but they are not the solution in themselves.

Those considering mechanization of systems should study this very carefully before it is undertaken. There is nothing glamorous about a large machine system which fails to solve the fundamental problems and which costs so much to operate it becomes a burden. Therefore make a careful analysis to consider whether mechanization is worth while. Consider these factors:

Files (the inventory of information)

1. Size
2. Accession rate
3. Inquiry rate
4. Value of the contents
5. Character of the information
    - *a.* Text or data?
    - *b.* Logically related?
    - *c.* Structure or drawings?

Environment

1. Budget
2. Staff
3. Growth rate of the organization
4. Other duties for the staff
5. Time available
6. Competence to handle machines
7. One site versus many.

Mechanization Scale

1. None
2. Cards
3. Images
4. Special-purpose digital
    - *a.* Small—medium—large
    - *b.* card—tape—disc.

Many organizations that have large information collections usually have computing facilities for other uses. This equipment can often be used part-time for information retrieval. If there is a choice, and charges are made only for the time the equipment is used, then quite often it is more economical to use the fastest and biggest machine available.

Output Forms

1. Item references
2. Titles
3. Abstracts
4. Information or data
5. Digests
6. Pictorial representations or displays.

Many systems provide the item references in the form of report numbers or accession numbers. Many provide titles and/or abstracts. Permuted title indexes are now receiving widespread attention. However, these are not primarily a searching aid for stored items. Their main function is as a dissemination service for current awareness of literature generated. The information or data itself is sometimes supplied as the primary reference in systems such as libraries, where the book is retrieved or in searches for chemical compounds where the chemicals are the answer.

Many systems store pictorial representations in full form, microstorage form, or digital form. Output is provided as drawings, maps, or chemical structures. Much work is under way to store pictorial representation, such as the chemical structure in packed, coded or binary form, with the reproduction of the original pictorial form upon request either as a display, on film, or printed. There are well over one hundred equipment systems commercially available which are capable of information storage. The approaches are different and the costs vary widely. The characteristics of each configuration can be compared for their advantages and disadvantages.

In summary, on equipment, a variety is available. There is no serious limitation in its capability. Equipment is expensive. Equipment should be considered only after the objectives of the system have been determined, the requirements outlined, and the cost factors understood.[15]

RECOMMENDATIONS

Many will be setting up new information functions in many areas. Here are some thoughts which might be of help. If you are in an area of technology which is stable, then your information requirements may not be severe. However, if your technology is changing, if you are faced with competitive pressures through rapid development of new processes, services, and products, and you find that both time and people are in short supply, then it is probable that the technical function you serve can be improved by advanced information processing. Consider the following steps in your analysis:

1. What do your people do?
2. What information do they need in each step of their work?
3. Where do they obtain this information now?
4. Where should it be obtained?
5. Are they receiving it rapidly enough?
6. Is the information complete?
7. Is the information your organization generates reusable?

8. What should you keep permanently?
9. What other information services are available to you?
10. What kind of information functions should your organization maintain?
11. What information function should be undertaken by technical societies?
12. What information functions should be operated by government?
13. How should these functions be supported?

Consider each of these steps and then you can work toward some goal. Information is a necessary raw material in effective science and engineering. The men who work in the plants have their materials brought to them. We would never allow a bricklayer or a mechanic to waste his valuable time and energy chasing after his materials. Can we allow the typical scientist or engineer to spend 25 per cent or more valuable time in trying to keep up? Can we let him spend additional time because he never even hears about the relevant information which originated in another area unfamiliar to him? You can assist your people and can improve their progress by efficient information services.

SUMMARY

The information habits of engineers are changing. It is no longer practical for each individual to operate a complete information function for himself. Information available is greater in magnitude than anyone can cope with individually. Today's engineer needs help with his information processing. We want to provide him with a means to utilize these documents effectively. We believe he should be provided with a service to which he can go when he requires information beyond his own personal capability. Certainly he will read the portions of literature important to him and may maintain a small collection of highly useful documents for his work. He needs help beyond this.

Here are the important points:

1. Information is an integral part of engineering. Communications cannot be viewed solely as librarians' work. A larger and increasing fraction of technology's resources, including men and money, has to go into handling the information that technology generates if it is to be used effectively.
2. Individual authors must accept more responsibility for the published literature. Authors of technical articles should provide informative titles and indexes and abstracts along with their articles. More important, authors should refrain from generating unnecessary and poorly organized material.
3. Techniques of handling information must be widely taught and understood. The modern engineer must be familiar with modern methods for information processing. Colleges and universities and engineering administrators should be encouraged to teach and to understand information handling.
4. Each organization should set up an effective information function to serve the needs of its people.
5. Centralized information functions should be set up to serve the needs of many users where these needs are not handled by the internal systems.

6. Each of us has responsibility for proper stimulation for the development and effective operation of information functions in our own or in other service organizations.

Information is a valuable resource. We must use it wisely. One organization, the American Institute of Chemical Engineers, is attempting to serve its membership with necessary education, services, and stimulation in the use of these new tools.

These concepts have been adopted and extended by the Engineers Joint Council. They have a thesaurus of engineering terms. Source indexing serves as the beginning of a programme leading toward an operating Engineering Information Center. This will be one part of the larger network of centres, each covering its own area of responsibility. The techniques that have been presented may not serve your particular needs. They have, however, worked well in the areas in which they have been applied.

Assess the information requirements of your organization. Provide it with the services needed. Establish the relationship between your information function and other existing services. Encourage other agencies to assume their responsibilities. Insist that they determine their objectives, analyse their responsibilities, develop a plan, and implement a programme. Conduct research in improved information processing. Discuss the subject intensively. Above all, test the results of your efforts and assess their values. Critically examine the results of your labours. Through aggressive, intensive effort the organizations you serve will be in the forefront in their fields ten years from now if you effectively utilize the information available to you today.

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Miss B. A. Brown
Secretary to the Director of Research and Development
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Miss J. Te Groen, Principal Librarian of the Cape Provincial Administration, will be available in LONDON during the week commencing 7th June, 1965, to interview prospective candidates. Applications on the prescribed form and particulars of the post, location and country are obtainable from The Attache (Ref. CA/L), South African Embassy, Trafalgar Square, London, W.C.2.

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From time to time other articles of interest are included. Recent examples are articles on the Science Museum Library, by J. A. Chaldecott, and the libraries of British Nylon Spinners, by Wilfred Ashworth. Specimen copies are available on request.

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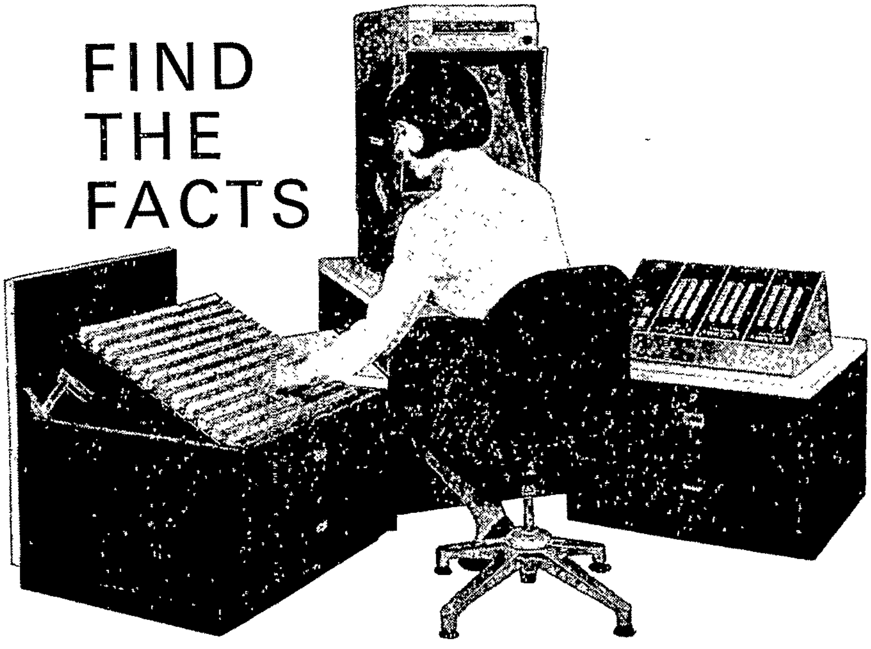

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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 17 June 1965 Number 6

ASLIB CALENDAR 1965

June

MON.21.	Evening meeting at Aslib, 5 for 5.30 p.m. Joint meeting with Institute of Information Scientists. Walter M. Carlson, Director of Technical Information, United States Defense Documentation Center.
MON.21 – FRI.25.	Senior introductory course to special library and information work.

July

FRI.9 – SUN.11.	Electronics Group 7th conference, Ashridge.
TUE.20.	Visit to Port of London Authority.

September

WED.29 – FRI.1.	39th Annual Conference at University of Keele. See paragraph below.

Focus on Information and Communication

This is the title of a new collection of papers edited by Barbara Kyle and published by Aslib in May. Miss Kyle's aim is to make widely available this selection of studies on information and communication by authors in peripheral fields and to introduce these authors to each other and to Aslib's field of endeavour. Some of the subjects or areas discussed are machine generated index vocabularies, computers in botany, problems of communication in the social sciences, and psychological applications of programmed learning and topic analysis.

The papers include five articles which have appeared in library or scientific journals, two by Baroness Wootton, the others by Dr A. R. Meetham, Professor Patrick Meredith and Professor W. T. Williams. The collection begins with two papers not published elsewhere, by Rupert Crawshay-Williams and James K. Feibleman. *Focus* is available from Aslib, price 14*s* a copy; an order form is enclosed with this issue.

39th Annual Conference, University of Keele

This is to remind members that the dates for the 1965 Aslib Conference are 29th September to 1st October. If you have not yet received your programme and application form, please ask for one from The Meetings Organizer, Aslib, 3 Belgrave Square, London SW1.

Midlands Branch

The 14th Annual General Meeting of the Branch was held on Tuesday 23rd March. The Officers and Committee elected for 1965–6 are as follows: Chairman, Mr J. L. Atkins; Vice-Chairman, Mr B. C. Burrows; Hon. Secretary, Mr D. F. Reardon; Hon. Treasurer, Mr C. P. Auger; Committee, Mr D. E. Bagley, Mr J. H. L. Bridgewater, Mr K. Davison, Miss G. O. Gillam, Mr R. Haynes, Mr L. T. Oldaker, Miss P. Royston, Mr J. R. A. Walker, Miss M. I. Williams.

Economics Group: Miss Eirlys Roberts

The Group's annual luncheon and Annual General Meeting (noted in the May issue of *Aslib Proceedings*) were held at the Criterion on 24th March. Miss Eirlys Roberts, Editor and Research Director of *Which?*, was the guest speaker after the luncheon, and spoke briefly on two subjects she thought might interest members of the Group.

First, although Britain was outside the Common Market this was not preventing a United Kingdom consumer organization—Consumers' Association—from co-operating with its opposite numbers in the Common Market. Nine consumer organizations are represented in the Bureau Européen des Unions Consommateurs (BEUC), including the Dutch and Belgian organizations which are similar in structure to the Consumers' Association in this country, and others which include representatives of women's organizations, trade unions, co-operative societies, and the French government-sponsored organization.

BEUC itself is essentially a political body representing the consumer interest on the Common Market's European Committee of Contact on Consumer Problems. But it has also a most interesting subsidiary organization—Euro-test, which plans and carries out test programmes on consumer goods that are available in all the Common Market countries. Britain's CA was invited to send observers to BEUC and to take part in the Euro-test meetings.

As a result CA is co-operating in the Euro-test programme and goods on the United Kingdom market are included in the tests. All this in spite of the fact that the chairman was in the beginning and for some time afterwards a Frenchman.

So far the journals of the various organizations have carried Euro-test reports on aspirins (tests in Belgium) and foodmixers (tests in West Germany). The future programme includes cameras and foglamps, which are to be tested in the United Kingdom, and electric irons, to be tested in West Germany. The terms of reference for the test have to be agreed by all members of Euro-test, and so far this piece of international co-operative work has proceeded remarkably smoothly.

In the second part of her speech Miss Roberts described some of her experiences, both as a member of the Treasury Information Department and as Editor of *Which?*, in presenting facts and figures to the various sections of the population. When, as a member of the Treasury staff, she spoke to women's groups on the country's economy and the need for the export drive, these groups had suggested that the best help they could give would be to demand a better quality of goods on the home market. It was as a result of this thinking that *Shopper's Guide,* which preceded *Which?* by a few months, was established in 1957.

She also said that both then and now she had found people demanded specific information. Generalizations were not only a poor form of communication but also dangerous. In the discussion that followed, Miss Roberts said that CA had come to the conclusion that consumer advice could be given to certain sections of the population only orally, not through the printed word, for which they had an innate distrust.

She also commented on the problems of presenting balanced and detailed information through mass media, for example television, and added that 96 per cent of CA's members had said they wanted the much-criticized—by manufacturers—'best buy' to be given in *Which?*

At the conclusion of the luncheon a presentation was made to Mrs E. E. Stowell, retiring Chairman of the Group, by the Committee. The deep gratitude of the members and committee was expressed for Mrs Stowell's years of unflagging service to the Group since its foundation in 1951.

IFLA General Council 1965

The 31st Session of the General Council of the International Federation of Library Associations will take place at the University of Helsinki from Monday 16th to Saturday 21st August. The theme for 1965 is 'International Co-operation Year: the international and linguistic aspects of library service'. Delegates and observers from library associations throughout the world will be attending and besides plenary meetings there will be a number of sections and committees on, for example, union catalogues and international loans; special libraries; library education; and rare and precious books. There will be visits to a number of Finnish libraries and a reception by the City of Helsinki.

Members of Aslib who intend going to the IFLA meetings are asked to let the Director of Aslib, Mr Leslie Wilson, know as soon as possible.

Mr Geoffrey Shires

The retirement has been announced of Mr Geoffrey Shires, head of the research and technical information services at Fort Dunlop and the Dunlop Research Centre since 1941. Mr Shires is a very old friend of Aslib and was for many years a member of Aslib Council and Chairman of the Midlands Branch. He was one of the founder members of the Branch, and an active Committee member after retiring from its Chairmanship. He has lectured on Aslib courses and was a frequent speaker at Aslib meetings and conferences.

For a number of years Mr Shires was Chairman of the Institution of the Rubber Industry Papers and Publications Committee. Aslib members wish him every happiness in his retirement and hope still to see him at conferences or meetings.

FID Report for 1964

The latest annual report of the International Federation for Documentation* describes some important achievements by the Federation during 1964. One was the second International Study Conference on Classification Research at Elsinore, organized by FID/CR and attended by about sixty experts from sixteen countries. The *Proceedings* of the Conference are to appear in 1965. The need for a French-language manual covering the field of document reproduction and selection was fulfilled by the publication of a *Manuel pratique de reproduction documentaire et de sélection* edited by P. Poindron. Another publication was vol. II (Social Sciences) of the *Index bibliographicus*—financed by Unesco—which completes the 4th edition.

The report refers to several FID projects started during the year: for example, the elaboration of an ISO draft recommendation for the presentation of conference papers and proceedings; the draft of a list of documentation terms in different languages, which has been submitted to Unesco; and a long-range programme for training of documentalists, probably with the publication of an annotated world list of training courses.

Other topics include the activities of the national committees of FID, its expanding membership, and its work on classification (particularly the revision of UDC). The report, which is also published as vol. 32, no. 2 (1965) of the *Revue internationale de documentation*, is available from FID at 7 Hofweg, The Hague, Netherlands.

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* *Report of the Secretary-General on the activities of the Federation in 1964*. The Hague, March 1965. (FID 366.)

ICCP Newsletter

During the International Conference on Cataloguing Principles in October 1961 it was agreed that the work initiated at the Conference should be continued through the Organizing Committee. This Committee has now issued its first *Newsletter,* and future numbers will be sent to anyone who is interested. Issue no. 1 describes the work and publications of the Committee to date; there are special references to the *Report* of the Conference and Mr A. H. Chaplin's *National usages for the entry of names of persons,* both published in 1963. For the future it is proposed that the reports of the ICCP will be part of a larger series of publications produced by IFLA, which will also cover other aspects of international librarianship. These will be announced in later numbers of the *Newsletter.* It will act too as a 'clearing house' for international cataloguing problems, and its readers are invited to send news of cataloguing developments in their own countries, or queries on cataloguing problems that are international in scope, to the office of the Committee. The address, to which requests for copies of the *Newsletter* should also be sent, is Organizing Committee of the International Conference on Cataloguing Principles, c/o The British Museum, London WC1. The Executive Secretary is Mr A. H. Chaplin and the Assistant Secretary Mrs Dorothy Anderson.

Classification of Library Science

The Classification Research Group has recently issued a draft scheme for a Classification of Library Science. This is strictly an interim edition, of which only a limited number of copies are available, and a definitive edition is to be prepared during the coming year.

It is hoped that any members with special collections on library science (including information retrieval) will be willing to purchase the draft classification in a spirit of experiment so that informal tests of its application and practicability can be made before the definitive edition is completed. Members of Aslib are invited to make notes of the weaknesses and omissions of the scheme in their own libraries and to send these notes on to the CRG; their co-operation will be valued.

Copies may be obtained, so long as the supply lasts, from Mr J. Mills, c/o Aslib, 3 Belgrave Square, London SW1, price 10*s* 6*d.*

Directory of British Associations

This is the largest directory of British associations yet to be published and provides detailed information. The scope is clearly defined in an introduction, and besides the name, address and telephone number, a category coding is used to show the type of organization (international, political, trade, etc.) and brief details of any regular publications are included. There are indexes to abbreviations, publication titles and subjects.

Copies are available from the publishers, C.B.D. Research Limited, 75 Park Lane, Croydon, Surrey (telephone Municipal 7672), price 60*s*.

SIGMA Papers

SIGMA (Science in General Management Limited) have been issuing a series of study papers over the last two years which they are now making available—while the papers are in print—to librarians or information officers not only in management but in other fields. The papers average about fifteen pages each and include essays on 'Human systems research' by Leslie T. Wilkins (Paper no. 9), 'An essay on operational research' by Stafford Beer (no. 1), and 'Cybernetics and production' by Basil Baldrey (no. 7). Members of Aslib who are interested in this series should write to SIGMA Research Centre, Wettern House, Dingwall Road, Croydon, Surrey.

Experiment in Medical Information

After the establishment of MEDLARS in 1964, the United States National Library of Medicine made it known that it was prepared to supply copies of the MEDLARS tapes to organizations in other countries that would provide national searching services for medical literature on the lines of those already provided in America. The Department of Scientific and Industrial Research, with the support of the Medical Research Council, the Ministry of Health and the Royal Society of Medicine, put forward proposals for a co-operative scheme whereby the Computing Laboratory of the University of Newcastle upon Tyne, under contract, would set up the searching service and operate it over the experimental period, and the National Lending Library for Science and Technology would acquire and apply indexing skills and also ensure the supply of literature to back up the retrieval service.

These proposals have been approved by the National Library of Medicine and a contract placed with the University of Newcastle upon Tyne. Staff from the University and the National Lending Library have gone to Washington to acquire the necessary background. Administrative responsibility for the project lies with the new Office for Scientific and Technical Information and it is expected that the service will be announced early in 1966. By that time arrangements will have been made for a systematic evaluation of the scheme both in America and in this country; it has already aroused considerable interest in medical circles and may well prove to be of equal interest to the pharmaceutical and related industries.

Further information should be requested in the first place from the Department of Education and Science, Curzon Street, London W1 (telephone Hyde Park 7070).

Oak Ridge Laboratory

In a recent letter Mrs Helen M. Mason, Librarian of Oak Ridge National Laboratory, has issued an open invitation to English members of Aslib to visit the Laboratory whenever they are in America. Oak Ridge Laboratory is operated by the Union Carbide Corporation, Nuclear Division. The address, for anyone who would like to get in touch with Mrs Mason, is Post Office Box Y, Oak Ridge, Tennessee 37831, USA.

New NLL Publication

The National Lending Library for Science and Technology has issued the first number of a new periodical, *Index of Conference Proceedings received by the* NLL. The NLL is trying to make its collection of recent conference proceedings in science and technology as comprehensive as possible, and the aim of the index is to help borrowers to obtain these on loan, by providing a keyword index to make identification easier. Issue no. 1 lists 1,404 entries and is based mainly on the conference proceedings received at the NLL during 1964. It is arranged in two parts, the first by title entry and the second by subject keyword.

The Index will probably appear quarterly. Copies may be obtained, free of charge, from the Gratis Publications Department, National Lending Library for Science and Technology, Boston Spa, Yorkshire.

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AN EXAMINATION OF CITATION INDEXES

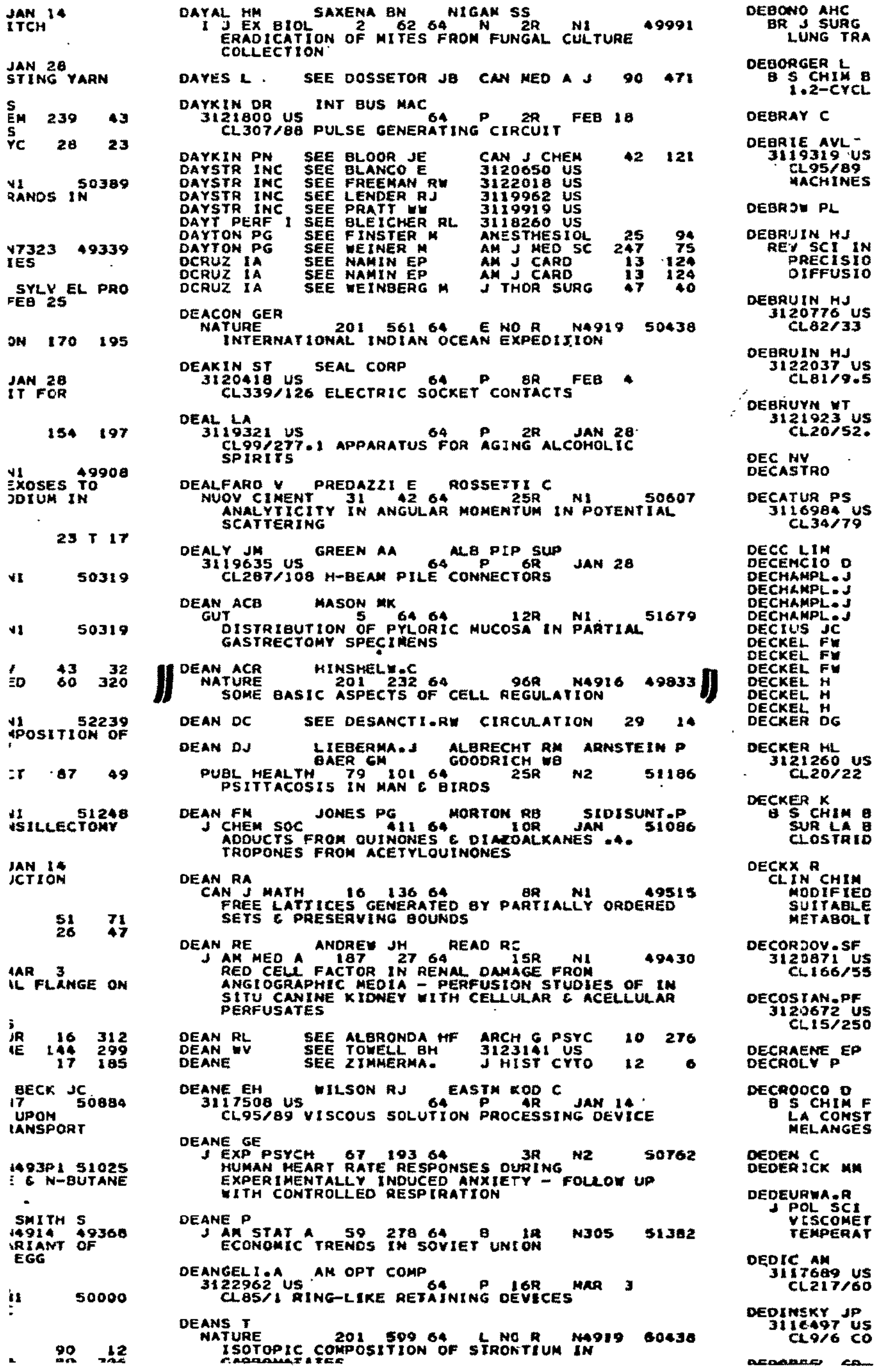
JOHN MARTYN
Aslib Research Department

Evening meeting, London, 31st March 1965

IN the past few years two methods of information access using the citations given in published papers have been developed. These methods are citation indexing and bibliographic coupling, and although they are closely related it is important clearly to distinguish between them. In essence, bibliographic coupling is a concept developed by M. M. Kessler of the Massachusetts Institute of Technology, concerned with the relation existing between two documents by virtue of their joint descent from a third—that is, two documents are said to be coupled if they both cite the same document, and the strength of the coupling is determined by the number of citations they have in common.[1] We are here primarily interested in citation indexing and will therefore only discuss Kessler's work as it becomes immediately relevant to this subject. A citation index is 'an ordered list of cited articles each of which is accompanied by a list of citing articles. The citing article is identified by a source citation, the cited article by a reference citation. The index is arranged by reference citations.'[2] It is helpful at this stage to think of the source citations as descendants, and the reference citations as their ancestors.

It will be easier to see what this means if at this point we look at two sample pages, taken from the *Science Citation Index* for the first quarter of 1964, produced by the Institute for Scientific Information, Inc. The first page (Figure 1) is from the Source Index. We see, for example, that an author named DEAN, A. C. R., has a paper called 'Some basic aspects of cell regulation' in *Nature,* vol. 201, beginning on p. 232, in 1964: HINSHEL, W. C., was a co-author. It has ninety-six references (ninety-six ancestors) and is an issue, part or supplement, no. 4916. The number 49833 is the ISI accession number. Although we are not told so here, one of the references is to a paper by J. E. M. Midgley, in *Biochim Biophys Acta,* vol. 61, p. 513, 1962.

If we now go to the Citation Index (Figure 2) and look at the entries under Midgley, J. E. M., we find that his 1962 paper was cited by, as we know, Dean and Hinshel; it was also cited by three other authors in the first quarter of 1964, so, as Kessler would say, all those four papers are coupled at strength one (and maybe more). What has happened is that the citations given in the 1964 papers by these authors have been sorted alphabetically by cited author, thus bringing these four references to Midgley's paper together. Midgley's paper has four descendants in the period covered by this index.



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   BR J SURG
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DEBORGER L
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DEBRAY C

DEBRIE AVL
   3119319 US
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DEBRUIN HJ
   REV SCI IN
      PRECISIO
      DIFFUSIO

DEBRUIN HJ
   3120776 US
      CL82/33

DEBRUIN HJ
   3122037 US
      CL81/9.5

DEBRUYN WT
   3121923 US
      CL20/52.

DEC NV
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   3116984 US
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DECC LIM
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DECHAMPL.J
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      CL20/22

DECKER K
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DECKX R
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      MODIFIED
      SUITABLE
      METABOLI

DECORDOV.SF
   3120871 US
      CL166/55

DECOSTAN.PF
   3120672 US
      CL15/250

DECRAENE EP
DECROLY P

DECROOCQ D
   B S CHIM F
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DEDEN C
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DEDEURWA.R
   J POL SCI
      VISCOMET
      TEMPERAT

DEDIC AM
   3117689 US
      CL217/60

DEDINSKY JP
   3116497 US
      CL9/6 CO
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FIGURE I

This is an example of one sort of citation index—probably the best known, certainly the most widely publicized. The source material in the *Science Citation Index* is drawn from about seven hundred journals in 1964 (613 in 1961), all items in these journals, with the exception of ephemera such as advertisements and announcements, being processed. 'The emphasis in journal selection has been the multidisciplinary journals. These are, generally, recognised as important in each country, but are only selectively and fragmentarily covered by the discipline oriented indexing services.'[3] The journals broadly cover the whole field of science, with emphasis to some extent on the life sciences. Other citation indexes have been confined to one subject area, such as the *Genetics Citation Index,* also produced by the Institute for Scientific Information, in 1963, and the index to statistics which is being produced by Dr John W. Tukey. Some have been produced as indexes to the material appearing in one journal, the outstanding example being the index to volumes 1–31 of the *Annals of Mathematical Statistics.*[4] This has a citation index to papers appearing in the *Annals,* arranged by author, which gives the reference to the paper, a reference to the abstract or abstracts of the paper (eight abstracting journals were searched to provide this), references to papers in the *Annals* citing the original, and references to papers in *other* journals citing the original, these last being produced by searching thirty-seven journals in the statistical field, the proceedings of three Symposia, and three presentation volumes. In addition a subject index in great depth to papers and often to the content of specific pages is given, and, a most interesting feature, a 'forwards' Citation index, collecting and listing the citations *to* other journals by authors of papers appearing in the *Annals.* This index was produced without the aid of a computer. The index to the *Journal of the American Statistical Association,* vols. 35–50, also includes in its author index a note of subsequent citing papers in the journal, but in no other journal, and so is on rather a small scale. It also was hand-prepared. Tukey[5] reports two other citation indexes, one a *Bibliography of non-parametric statistics,* by I. R. Savage, Harvard University Press, containing 'for each item, indications of the other items in the bibliography which were known to refer or, in the compiler's judgment, should have referred to the item in question;' the other is the annual index to Institution of Radio Engineers, *Transactions of the Professional Group on Information Theory,* 1958 to date, which contains, as an 'Index to footnote references', an author-ordered list of footnote citations from that volume to all items. A citation index to the published proceedings of the two United Nations International Conferences on Peaceful Uses of Atomic Energy was compiled by Itek Laboratories for experimental purposes, and the work involved has been reported by Ben-Ami Lipetz.[6] The index is not publicly available. Another index was prepared by Lipetz in a limited part of the field of Physics,[7] in connection with an experimental evaluation of the impact of a citation index, and I shall mention this in more detail at a later stage.

Finally the Short Papers contributed to the Theme Sessions of the 26th Annual Meeting of the American Documentation Institute, in December 1963 published in two volumes under the title *Automation and scientific communication,* contains a Citation Index to all the references cited in the papers, arranged by author and giving the full bibliographic details, including titles, of all citations,

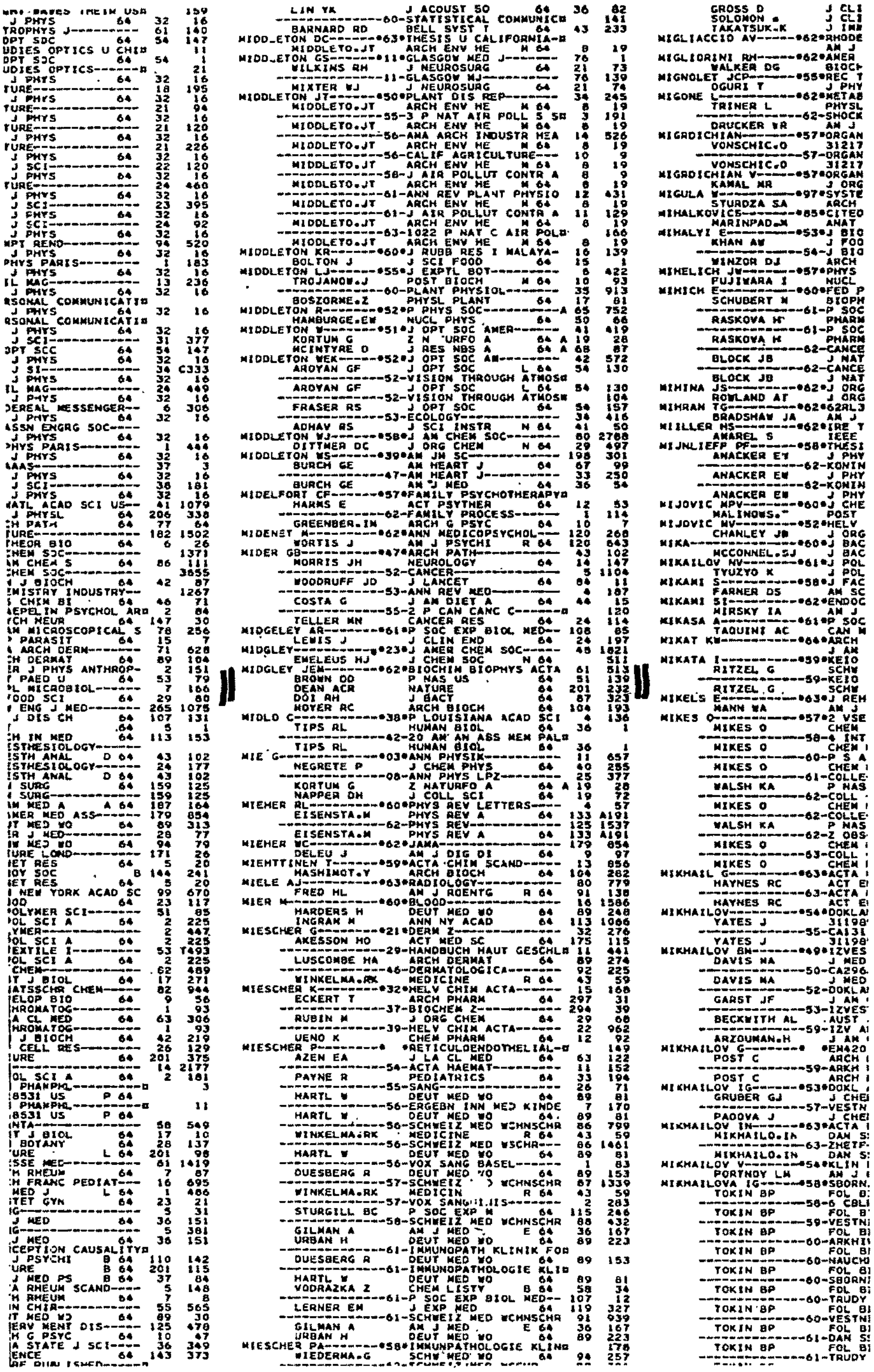

FIGURE 2

and additionally a KWIC index to these references. This was prepared on an IBM 1401.

We have seen that citation indexes can be prepared covering a large part of the field of science and technology, or specific areas, or to one journal-series, or indeed to any body of literature. They can be annual, cumulative or 'once-for-all' jobs, depending on the nature of the subject and the material. They can be arranged by author, by journal or even, if specific to a particular journal, by initial page of the cited item, as Tukey has suggested, although this last arrangement seems rather exotic. They are flexible devices and can be arranged in whatever way most suits the convenience of the user. They can be prepared by hand, but this is a considerable undertaking, and if the scope is to be at all wide, or if speed of production is important, then a computer must be used. To demonstrate this last point, we may note that the 1961 *Science Citation Index* has 102,000 source articles from 613 journals, giving a total of 1,370,000 citations, which when sorted and arranged give references to 890,000 papers by 258,000 authors. The majority of these papers were cited only once in 1961, but many were cited more than once, the most frequently cited being a paper by O. H. Lowry,* which was cited more than five hundred times.

Machine processing has its own problems, however, the most obvious one at the moment being that of inaccurate citation by authors. J. E. Terry[8] notes that of forty-six citations discovered in the course of a search involving the 1961 *Science Citation Index* for material in physics, eleven contained errors in the page number, volume number or year, and one quoted the wrong journal; in every case the mistake had been made by the citing author.

In using the *Science Citation Index* for retrieving references in the fields of biology and chemistry I have also found errors in citation, although the proportion was very much lower than that found by Terry (which incidentally suggests the possibility that physicists have different citation habits from chemists and biologists). We all know that papers frequently contain incorrect citations, but perhaps had not realized that the incidence of error was so high. This error-rate is, of course, no reflection on the compilers of the *Science Citation Index*; to check every citation in every paper processed is an impossible task, and one which more properly should be carried out by authors, referees and editors. Another sort of error which frequently occurs is misfiling the authors of citations; as an example, if a paper by SNAPE, F. J., is cited by three authors, the first referring simply to SNAPE, the second to SNAPE, F. and the third to SNAPE, F. J., this results in three separate author entries for the three isotopes of SNAPE, first for SNAPE *per se,* and the second and third for the forms SNAPE, F. and SNAPE, F. J. This sort of error, though, is only a minor irritation.

Citation indexes have had a mixed reception. I will risk a generalization, and I emphasize that it *is* a generalization, based largely on personal contacts, and say that scientists are on the whole in favour of them, while librarians are much more cautious. As an illustration of the scientist's view—perhaps an extreme view—Dr J. M. Hammersley,[9] reviewing the Index to the *Annals of*

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* Protein measurement with the Folin phenol reagent. *Journal of Biological Chemistry,* vol. 193, 1951, p. 265.

Mathematical Statistics in *Nature,* said 'Librarianship in the future will become a task less for the bibliophile and more for the electronic engineer. With the publication of these indexes . . . the writing is already on the library wall'. Examples of the librarian's view are harder to come by, but a representative view is expressed by E. M. Keen,[10] who wondered '. . . whether the citation index would look so attractive if similar effort was being expended on conventional indexes.'

We know that following up references cited in relevant papers is the scientist's most favoured method of obtaining information;[11] it is not therefore very surprising that a device which allows them to move forwards in time as well as backwards is greeted with enthusiasm. I suggest that there is another attraction for the scientist. We know too that using a library card index to gain information is second in unpopularity among scientists only to asking a librarian for assistance.[11] (We do not know why this antipathy exists, we only know at present that it does, and deploring the fact does not change it.) A citation index allows them to attack the literature directly, in a way to which they are accustomed, without benefit of intermediaries, and I believe that this is a factor which possibly influences the scientists' initial acceptance of the Citation Index. To borrow an idea from John Tukey,[12] the librarian is concerned with information retrieval, whereas the scientist is more interested in information *access*; regarded as a retrieval tool, the Citation Index is not as efficient as some more conventional approaches to the literature, but as an *access* tool it functions very well.

Before we discuss specific methods of using it we must be clear on one point. The Source Index is in effect an author index to all items published in the titles covered by the *Science Citation Index* in the particular year for which the Index is issued, but the Citation Index itself is *not* an author index, and should not be used as such. It is an index to specific documents which are cited by those other documents which form the Source Index, and is arranged by first author purely for the convenience of the user. It should not be used for compiling author bibliographies, firstly because it lists first authors only and secondly because a first author's paper will only form an entry *if* it has been cited by one of the items in the Source Index.

We enter the Index with a citation or citations, which can be obtained in various ways. Perhaps we choose one specific paper we know to be highly relevant to our subject of interest and use this as our entry-point, in which case the sort of question we are asking is 'What use has been made of this information? Has this information been modified? Has this idea been followed up?' If we take the most recent relevant paper and use its bibliography as our entry citations we are asking 'What work is there parallel to this?', arguing along the line that the greater the number of citations two papers have in common (the greater the strength of the bibliographic coupling), the greater is the probability that they are about the same subject.

How many citations we use to enter the Index has, of course, a profound influence on the return we get from it. It must be remembered that citation of a particular paper in a given year is a low-probability event[13]—in other words, the average paper is not cited very often. To illustrate this I used 389 references to work published in 1958, 1959, and 1960, on the subject of Biological Control of Insect Pests and Weeds, as citations with which to enter the 1961 *Science Citation Index*; 123 items were cited in 1961, 266 (68 per cent) were not. Another example: using 1,045 references between 1950 and 1963 on the subject of the semi-conductor properties of Gallium as entry-points to the Science Citation Index for the first six months of 1964, 163 items were cited, 882 (84 per cent) were not. Assuming that this citation rate would hold for the last six months of 1964 (assuming, that is, that about 163 more citations can be expected in that period, giving about 326 for the whole year), we get a non-productive rate of 69 per cent, remarkably close to the 68 per cent we obtained in 1961 with the biological literature. We cannot yet say, based only on these two observations, that our chances of getting anywhere in the Citation Index when we enter it with any one citation are about three in ten, but I think we can say that if further work showed the probability to be around 0.3 we would not be terribly surprised.

If you *do* get anywhere, then by the process Dr Garfield calls 'cycling' your returns increase quite rapidly. For example, Figure 3 is a partial map of what happened when I used a paper by White, H. G. and Logan, R. A. (Gallium phosphide surface-barrier diodes. *Journal of Applied Physics,* vol. 34, p. 1990–7) published in 1963, as an entry-point to the 1964 Citation Index, in search of material on Gallium semi-conductors. White and Logan were cited three times in 1964, by Cowley in the *Journal of Applied Physics,* by Thomas in *Physical Review,* A and by Spitzer in *Physical Review,* A. In the bibliography to Thomas's paper is a reference to Hopfield, *Physical Review Letters* 1963. Hopfield's paper was cited by Gross in the *Doklady Akademiya emii Nauk SSSR,* and Gross also cited Fuller, *Journal of Applied Physics* 1963. Fuller cited his 1963 paper in another paper in the *Journal of Applied Physics* in 1964. So it can be seen that by taking White and Logan's paper in 1963 as an entry-point, getting to the papers which cite it in 1964, using their bibliographies as entry-points and repeating the process, we can find fifteen 1964 references relevant to our subject. It can also be seen that whatever paper we choose as a starting-point in this network, either source-item or citation, we can retrieve all the others by cycling.

This is, I repeat, a *partial* map. When we note that Ehrenreich's 1961 paper was cited in fact not four times, as shown on our map, but eight times, and that Hall's 1964 paper carried fifty-three citations, Spitzer's thirty-one, Thomas's twenty-six, and so on, it is evident that the full source-citation map is much more complex. This means that a citation network is an inherently 'noisy' system, using 'noise' to describe material retrieved which is not immediately relevant to our search subject. There are, as we shall see, ways of reducing the noise.

To see what sort of return we get from the *Science Citation Index* and how much noise is produced we have carried out some small-scale tests. What we have done is to take a bibliography on a specific subject and divide it into two parts, one part being a number of references which, by virtue of their being published within the time-period covered by an issue of the *Science Citation Index,* are eligible for inclusion as source items, and the other part being earlier items which may serve as entry-points to the Citation Index. We have a bibliography on the semi-conductor properties of Gallium from 1950 to April 1964, including

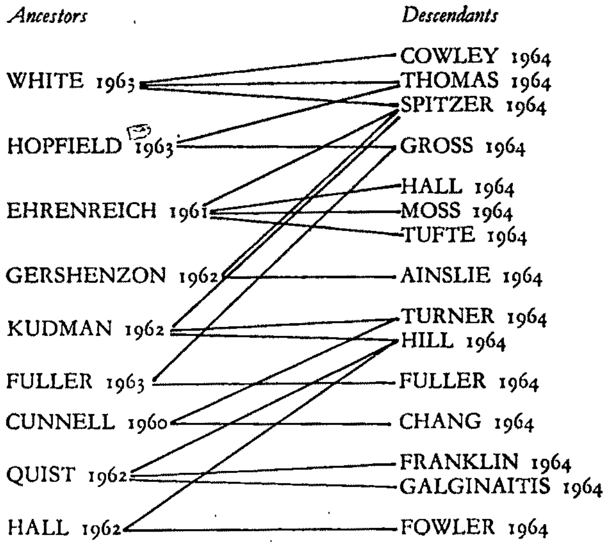

FIGURE 3

1,094 references, which divide into 1,045 references to 1963 and earlier, and forty-nine references to 1964.* So there are forty-nine references (all journal references) which are eligible for inclusion in the 1964 Citation Index as Source Items, and 1045 possible entry points to the Citation Index proper. Of the forty-nine references we might find as source items, we in fact find 22 (45 per cent), the remainder being in journals which are not covered in the first three quarters' volumes of the *Science Citation Index* (although two journals which will add eight references to the coverage will be included in the 1964 Annual issue, and this will make our percentage figure 61 per cent). This coverage figure, incidentally, can be compared with figures obtained using the 1961 *Science Citation Index* to examine a bibliography on Biological Control of Insect Pests; of the forty-three possible source items, twenty (47 per cent) were in journals covered for that issue of the Index. This means that, in these two examples, using the *Science Citation Index* we are going to find only about half of the relevant references published in the year in which we are interested.

This sounds like a condemnation of the Index, but a little thought will correct this impression. A bibliographic approach to coverage of abstracts journals[14] has shown that percentage coverage of twelve topics by the best-performing abstracts journal for each topic ranges from 87 per cent to 34 per cent, the mean percentage coverage by best service being 65 per cent. Further, these abstracts services were specific to one area of science, whereas the *Science Citation Index* is general to the whole field. To be able to cover about half the literature by taking about 2 per cent of the world's journals suggests not only that the journals are in this instance well-chosen, but that the distribution of journals by size looks something like this (Figure 4).

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* Section 11 of Gallium: *propriétés principales; bibliographie* by Dr P. de la Breteque *and* L'Institut de Recherches de la Societé Française pour l'Industrie de l'Aluminium, in collaboration with l'Aluminium Suisse SA (formerly Aluminium-Industrie-Aktien-Gesellschaft). Marseilles, June 1962, and supplements in June 1963 and June 1964.

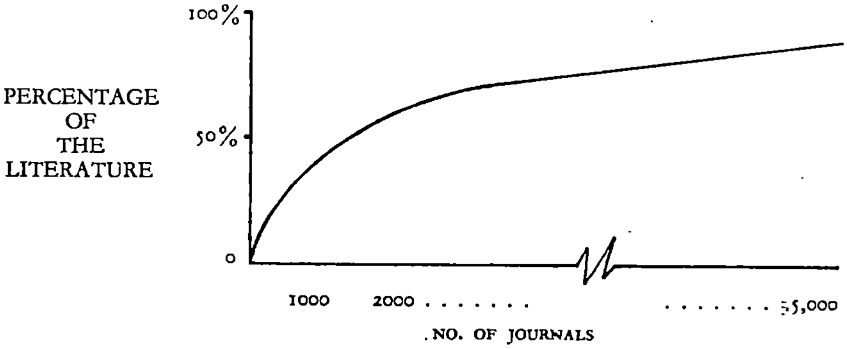

FIGURE 4

This is substantiated by Professor Derek J. de Solla Price:[15] 'It is probable that 80% of all scientific papers can be had from about 1,000 journals, and that 80% of all chemical papers would come from the biggest specialised journals totalling less than 100 in number, and even that better than 95% of the chemical literature could be had from less than 200 of the most eminent journals'. The study of *Physics Abstracts* by Keenan and Atherton[16] shows that 50 per cent of the items abstracted are drawn from nineteen journals. In 1959 Urquhart[17] reported 50 per cent of the demand on the Science Library to have been met by 350 titles only, which again supports our hypothesis.

Returning to our Gallium semi-conductor bibliography, you will remember that we had 1,045 pre-1964 references, and forty-nine references to 1964, of which twenty-two were listed as source items. We have used all the 1,045 pre-1964 citations as entry points to see how many of the twenty-two relevant 1964 items we can locate, how much 'noise' we get, and whether or not we find anything relevant which was not included in our original 1964 bibliography. Of the 1,045 citations, 163 led us somewhere, as I have already told you; eighty-three of these guide us to twenty out of the twenty-two source items we are seeking. We do not find two of our source items, as neither of them cites any of our 1,045 references. Two pre-1964 citations guide us to four source items each, six to three each, eleven to two each, and sixty-three pre-1964 citations guide us to one source item each; there is, of course, considerable overlap, illustrated by the fact that of Spitzer's thirty-one citations in his 1964 paper, eighteen are to items in our pre-1964 bibliography, which means we find his paper eighteen different times. We can split up the 163 references which led us to source items, relevant or 'noise', as follows: fifty-five lead to relevant source items only, eighty to 'noise' source items (i.e. items not included in our twenty-two 1964 items) only, and twenty-eight lead to both relevant and 'noise' items.

In addition to the twenty source items of the 1964 bibliography we were also led to sixty-seven 'noise' items which appeared between January and April 1964, and we have sorted them into three groups on the basis of title only. Thirty-six are probably not relevant to the subject of Gallium as a semi-conductor, twenty-seven may or may not be relevant, and four — and this is the point — definitely are. (For interest, I mention that first I, a non-chemist, sorted the titles, and subsequently a colleague who is a chemist sorted them and we reached identical conclusions, without looking over each other's shoulder). So we have found at least four new items relevant to our search, and I am awaiting with interest the publication in June of the next supplement to our Gallium bibliography, to see if they are picked up from the literature. If we class everything except that which is known to be relevant as 'noise', then we have altogether twenty-four 'signals' to sixty-three 'noises', a signal-to-noise ratio of 2 : 5, which we can crudely interpret as meaning that, in this particular case, of every seven references we found using the index two were highly relevant and five were not. All those which were not relevant to the search-subject, Gallium as a semi-conductor, were relevant either to Gallium alone or to semi-conductors alone.

This seems to be a high proportion of noise to be receiving and supports the view that citation indexing is inherently noisy. However, at both the source and citation ends of the cycling process we have the ability to use a filter to screen off some of the noise. This filter is provided by the titles of source and citation items. In the first Cranfield Project report,[18] C. W. Cleverdon pointed out that KWIC indexing would have retrieved 97 per cent of the test documents known to have been relevant to the test questions, which, he says, is 'an interesting commentary on the effectiveness of the titles of the reports and papers used in the project'. A. Resnick[19] has confirmed that (to recipients of a selective dissemination of information service) there is no significant difference between the usefulness of titles and of abstracts for the purpose of determining relevance of documents of work interests, and there have been several other experiments reported all indicating that titles are a fairly effective guide to the relevance of documents. So, when using a Citation Index, you enter it with a citation to something you know is relevant; if you are led anywhere you are led to one or more entries in the Source Index, and can find there the full titles of the sources. You inspect these titles and seek copies only of those which look relevant; then when you are examining the bibliographies of the papers so selected, you will choose as fresh entry points to the Citation Index only such references as either the title, or the citing part of the source item you have, imply are relevant. You thus block off probably not all, but certainly a number, of the 'red-herring' channels in your citation network, and can steer your search in the most-desired direction. You can also use authors as blocks. That is, you may know that Snape is working along a different line to the one in which you are interested, and so may block not only channels leading to Snape but possibly also those leading to any co-authors of Snape. And of course journal titles can be used as blocks in the same way. Provided that the user of the Citation Index has access to a library and can consult his source items without difficulty, and has such reasonable knowledge of the literature of his field as any reputable scientist has, I do not consider that the 'noise' generated by a Citation Index is an important factor in its use. You are *not* snowed-under by references because not only are your chances of getting anywhere with any one citation limited, but you are interacting with the system at every stage in the process of cycling, and can, in Tukey's terminology, 'thin' at will, thus controlling your search-product to some extent throughout.

By now you must by nursing a growing suspicion that I am secretly in the employ of Dr Garfield. This is, I assure you, not so. My remarks about the ability of the user to modify his search-pattern at will are the result of an opportunity I had of watching scientists using the Citation Index to gather references relevant to current research projects, an experience which I found most instructive and illuminating, not least because the scientists in question were able to make effective use of the index, and even tell us ways of using it, after not more than about ten minutes' discussion and inspection of it.

Naturally there are things one cannot do with the index, because it is essentially only a guide to the existence of information and not a container of information in itself, in the sense that an abstracting service is. It is not, and in the nature of things never can be, a substitute for all the more formal bibliographical tools, but neither is it in the strict sense supplementary to them. It is an additional tool in its own right. This point has been brought out by T. A. Waldhart,[20] who compiled a bibliography on the subject of lasers, using seven conventional abstracting or indexing services and the Science Citation Index for 1961. As only the Applied Science and Technology Index and Solid State Abstracts contributed a higher proportion of unique references than SCI, he concluded that while SCI may be claimed in this instance as supplemental to ASTI and SSA, it could be claimed on the same grounds that the other five services individually were supplemental to SCI. It is interesting to note that it took him 380 minutes to produce 124 references from the conventional services and 120 minutes to produce forty from SCI, an average in each case of three minutes per reference. We must also note that of the thirteen unique references produced by SCI all but three were *covered* in one or more of the conventional services, but were not *found* because they were not indexed under the terms by which the indexes were searched.

We must also note that one of the charms of a citation index is that it is produced with no intellectual effort, and can be used without any great intellectual effort. Its production and its use are essentially clerical processes and if, as Tukey and Waldhart suggest, a Permuted Title Index to the source citations were added to allow a subject approach, it would still be a clerical job to produce it. Given the computer programmes (which already exist), the only point at which human intervention is needed is in the input stage. The rest is mechanical.

A little earlier I suggested that librarians might be less inclined readily to accept the *Science Citation Index* than scientists and research workers. If this be true there are a number of possible reasons, two of the more definable being the publicity associated with its appearance and its price. It seems generally agreed that some of the publicity has made rather exaggerated claims for the indispensability of the Index, but in all fairness any commercial venture nowadays must be announced with a certain amount of drum-beating, even though to some ears the beat of a drum is not music. The price is a more serious factor than this. The Index costs $1,250 a year to educational, hospital and non-profit-making/non-Government supported organizations, and $1,950 a year for other organizations, with pre-publication reductions and a considerable reduction for second copies. This is a great deal of money, particularly when one realizes that for the same money an organization in the second category could buy *Chemical Abstracts, Physics Abstracts, Electrical Engineering Abstracts, Nuclear Science Abstracts, Biological Abstracts, Index Medicus, Engineering Index,* the 'Rubber Bible', and Whitaker's, and still have a sizeable sum left over. However, the *Science Citation Index* is, remember, a commercial venture, and is not now subsidized in any way from Federal or other resources. The price is reasonable in that the production of this Index is a very costly process, and if the Index is to be economically viable the price must obviously cover the cost. It is unfortunate that not all British special librarians are funded on the same scale as some of their counterparts in the United States.

The question we are frequently asked at Aslib is 'Should I buy a copy of the *Science Citation Index*?' In a sense this is not a meaningful question, because, to be realistic, if a literature-access tool is of any use at all (and we have seen that the *Science Citation Index* is of use) and allows you to approach the literature in a different way to that permitted by your existing tools, you will almost certainly buy it if you have the money. To put this a different way, if you cannot afford the Index, you have no problem, and if you can afford it you will probably buy it—it is, after all, only the cost of a copy-typist. This is, I realize, a gross over-simplification, but I feel very strongly that fully effective literature exploitation is something that cannot be done on a tiny budget, and that if an organization insists on attempting to operate information services on a shoestring then it is short-sighted and unrealistic, and cannot expect perfection in its services. This may seem to be a digression from our subject, but I have allowed myself to digress because I think the price of this service is not of the highest relevance.

Not *every* scientist greets the appearance of a Citation Index with enthusiasm. Dr Ben-Ami Lipetz has made an attempt to evaluate the impact of a citation index in physics on the literature-use habits of physicists.[7] He prepared a citation index in which it was possible 'to look up a known reference in either the *Physical Review* or the *Journal of Applied Physics* to learn whether, and precisely where, it was cited in four of the leading Soviet physics journals which are published in English translation by the American Institute of Physics'. Copies of the index were given to 470 physicists, and the increase in the demand on libraries for the Soviet physics translation journals was studied to assess the impact of the Citation Index. A questionnaire was also used, to which 260 physicists responded; of these 260, twenty-nine said they hadn't looked at the index, 189 had only looked it over, forty-two claimed to have used it. Only a small increase in use of the Soviet literature was noted, and it was concluded that although citation indexing in physics can produce a measurable impact on literature-use, its effect is not very large or dramatic. This is not very surprising, for several factors are operating here, such as resistance to the scientific literature originating outside one's own language-group. Analysis of the comments of the 260 respondents shows 122 (47 per cent) generally in favour of citation indexing, seventy-nine (30 per cent) neutral and fifty-nine (23 per cent) more or less not in favour of the idea.

We know something of the performance characteristics of the *Science Citation*

Index, but we do not yet know much about its use characteristics—I mean, how in practice scientists will use it, what they will expect it to do, and how well they will be satisfied with the results. Will it be used, like an abstracts journal, about equally for current awareness and for retrospective search? The ultimate test of any system or service is the degree of its acceptance by the user—the most perfect system, on intellectual terms, is of limited value if the user is resistant to it, and a defective system of greater value if it is used to a greater extent. If scientists like and will use the *Science Citation Index,* then it is worth having a copy available in the library even though you are personally convinced that your Classified Card Index is more use; particularly if the scientists do not use the card index. Therefore I feel that the need now is for some user evaluation of the *Science Citation Index*; we need to have it available for a few years, so that we may see the scientists' reaction over the long term.

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Letter to the Editor

CURRENT AWARENESS SERVICES

Dear Madam,

We have recently seen publicity advertising new scientific information services as making available, for the first time in the history of science, current scientific awareness services alerting scientists to only those articles on particular subjects of interest to them. May I please seek the support of your columns to put on record the services which have been available from this Centre for some considerable time now?

Nearly two years ago this Centre introduced Current Awareness Services forwarding notification of publications from current scientific literature on subjects named by the inquirer to describe his interests. Material is forwarded weekly in the form of subject-classified cards, and cards for about one hundred different topics are now prepared.

The Current Awareness Service forwards references promptly, some within a week of publication of the original, though there is usually a somewhat longer delay. The service being on cards is very easy to use; it only takes a few minutes to read through the weekly cards on most subjects; those of interest can be retained and indexed away; those not of interest discarded. This gives an extremely easy way to building a card index tailored to the precise needs of the individual. As each reference comes on a separate card, all the busy Research Director need do to ensure that all members of his staff needing the material should receive it promptly is to mark on each card of interest their initials. Clerical assistants can then complete the distribution in a few minutes. The cost of the service per unit of information forwarded is a small fraction of that of some other classified Current Awareness Services covering scientific literature.

Subjects in the fields of physics, medicine, chemistry, biology, electronics and human sciences are offered in this service, and include 'Information Retrieval', 'Librarianship', 'Bibliographies', 'Education', 'Occupational Guidance' and a complete range of services on the subjects of 'Analysis' and 'Spectroscopy'.

Yours faithfully,

P. S. DAVISON,
Director

Scientific Documentation Centre Ltd,
Halbeath House,
Dunfermline, Fife.
1st April 1965

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

Books and Pamphlets

BAGRIT, *Sir* LEON
The age of automation. London, Weidenfeld and Nicolson, 1965. 86 p. (The B.B.C. Reith lectures, 1964.) 15s.

BAR-HILLEL, YEHOSHUA
Language and information: selected essays on their theory and application. Reading, Mass., Addison-Wesley, Jerusalem, Jerusalem Academic Press, 1964. x, 388 p. $12.50; 94s.

BUCK, PAUL
Libraries and universities: addresses and reports. Edited by Edwin E. Williams. Cambridge, Mass., the Belknap Press of Harvard University Press, London, Oxford University Press, 1964. xix, 172 p. $3.95; 32s.

*COTTON SILK AND MAN-MADE FIBRES RESEARCH ASSOCIATION
Catalogue of periodicals in the Shirley Institute library 1964. Manchester, the Institute, 1964. 158 p.

COUNCIL ON LIBRARY RESOURCES, INC.
The recording of Library of Congress bibliographical data in machine form. A report prepared for the Council . . . by Lawrence F. Buckland. Revised. Washington, the Council, 1965. x, 54 p.

DREXEL INSTITUTE OF TECHNOLOGY. GRADUATE SCHOOL OF LIBRARY SCIENCE
Science information and research: papers from a Drexel colloqium. [Contributors] Robert M. Hayes, Morris Rubinoff, Benjamin F. Cheydleur. Edited by E. J. Humeston. Philadelphia, the Institute, 1964. 26 p. diagrs. (Drexel Library School series, number 10).

HEYS, H.
The preparation and production of technical handbooks. London, Sir Isaac Pitman & Sons, 1965. viii, 183 p. 18s.

*KOPYCINSKI, JOSEPH V.
Textile industry information sources: an annotated guide to the literature of textile fibers, dyes and dyeing, design and decoration, weaving, machinery and other subjects. Detroit, Michigan, Gale Research Company, 1964. 194 p. (Management information guide: 4).

*LEWIS, H. K. & CO. LTD. MEDICAL, SCIENTIFIC AND TECHNICAL LENDING LIBRARY
Catalogue . . . New ed. rev. to December 31, 1963. Part I, authors and titles. London, H. K. Lewis, 1965. xii, 1056 p.

LOCK, REGINALD NORTHWOOD
Library administration. 2nd ed. London, Crosby Lockwood and Son, 1965. x, 150 p. (New librarianship series.) 18s.

MCCOLVIN, LIONEL ROY, *and* REEVES, HAROLD
Music libraries: including a comprehensive bibliography of music literature and a select bibliography of music scores published since 1957. Completely rewritten, revised and extended by Jack Dove. [2nd ed.] London, André Deutsch, 1965. 2 vols. (Grafton book.) £5 10s. Vol. I. General: organisation and contents. 172 p. *Vol. II. Literature and scores: bibliography. 744 p.

MEDICAL LIBRARY ASSOCIATION
Medical library careers. Chicago, the Association, [1965] 4 p. gratis.

MEYER-UHLENRIED, K. H.
Cooperation and progress in the atomic documentation field within Euratom. [Brussels,] Euratom, 1964. 16 p. (EUR 1812.e). Paper presented at the 29th Conference of the International Federation for Documentation, Stockholm, Sweden, October 1–6, 1963.

*NOTTINGHAM AND NOTTINGHAMSHIRE TECHNICAL INFORMATION SERVICE. TECHNICAL COMMITTEE
NANTIS handbook and directory of resources 1964–5. Edited and compiled by J. E. Toon . . . Nottingham, Central Library, [1964.] 12s 6d; 5s (members).

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
. . . Co-operation in scientific research. Prepared . . . by the National Council on Scientific Policy in Brussels. [Paris,] O.E.C.D., 1964. 22 p. (Series of bibliographies on science policy and research management, bibliography 11.) mimeog. In English and French.

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
. . . Methods employed in scientific research. Prepared . . . by the National Council on Scientific Policy in Brussels. [Paris,] O.E.C.D., 1964. 20 p. (Series of bibliographies on science policy and research management, bibliography 10) mimeog. In English and French.

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
Setting up your company's technical information service (with thirteen case studies). [Paris,] O.E.C.D., [1965] 59 p. $1; 6*s*; F4.

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT. DIRECTORATE FOR SCIENTIFIC AFFAIRS. COMMITTEE FOR SCIENTIFIC RESEARCH
Study on the utilisation of scientific and technical literature from China. Prepared by Marcel Locquin. Paris, O.E.C.D., 1965. 35 p. (DAS/RS/65.43) mimeog.

ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT. DIRECTORATE FOR SCIENTIFIC AFFAIRS. COMMITTEE FOR SCIENTIFIC RESEARCH
Study on the utilisation of scientific and technical literature from Japan. Prepared by Marcel Locquin. Paris, O.E.C.D., 1965. 17 p. (DAS/RS/65.59) mimeog.

PLUMBE, WILFRED J.
The preservation of books in tropical and subtropical countries. Kuala Lumpur, London, Oxford University Press, 1964. ix, 72 p. illus. $3.50; 20*s*.

*PULP AND PAPER RESEARCH INSTITUTE OF CANADA
Thesaurus of pulp and paper terms: a list of keywords with their cross-relationships for use in indexing and retrieving information on pulp and paper technology. [Edited and compiled by John E. Tasman, Peter M. Nobbs,] Pointe Claire, Quebec, the Institute, 1965. x, 97 p. $10.

RAND CORPORATION
Mechanized documentation: the logic behind a probabilistic interpretation [by] M. E. Maron. Santa Monica, the Corporation, 1964. 20 p. (P-2898). Paper presented at the Symposium on Statistical Association Methods for Mechanized Documentation, sponsored by the National Bureau of Standards and the American Documentation Institute, held at the Smithsonian Institute, March 17–19, 1964.

ROBERTSON, WILLIAM
Welfare in trust: a history of the Carnegie United Kingdom Trust, 1913–1963. Dunfermline, the Trust, 1964. 282 p. illus., map.

SIMON, BEATRICE V.
Library support of medical education and research in Canada: report of a survey of the medical college libraries of Canada, together with suggestions for improving and extending medical library service at local, regional and national levels. Ottawa, Association of Canadian Medical Colleges, 1964. xvii, 133 p. tables. Canadian $2.

SOCIETY OF TECHNICAL WRITERS AND PUBLISHERS. ANNUAL NATIONAL CONVENTION AND EXHIBITION, 11th. SAN DIEGO, CALIFORNIA, 14–16 MAY 1964
. . . Proceedings. Columbus, Ohio, the Society, [1964.] unpaged. tables, diagrs. $5.

UNITED STATES. NATIONAL SCIENCE FOUNDATION. OFFICE OF SCIENCE INFORMATION SERVICE
Current research and development in scientific documentation, no. 13. Washington, the Foundation, 1964. xxi, 486 p. (NSF-64-17) $1.75.

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Bureau of Ships Technical Library thesaurus of descriptive terms and code book. Compiled by Ruth D. Camp. Washington, the Bureau, 1963. xvii, [873 p.] various paging. (Navships-250-210-1).

VICKERY, B. C.
On retrieval system theory. 2nd ed. London, Butterworths, 1965. xii, 191 p. diagrs. tables. 35*s*.

*ZIMMERMAN, O. T., *and* LAVINE, IRVIN
Handbook of material trade names. [2nd ed.] Supplements, I, II, III. Dover, New Hampshire, Industrial Research Service Inc., 1956–1960. $48.67. Suppl. I. x, 383 p. 1956. Suppl. II. x, 356 p. 1957. Suppl. III. x, 400 p. 1960.

Articles and Papers

The AUTOMATIC typewriter: what it is and what it will do. *Office Methods and Machines,* vol.12, no.134, February 1965, p.104–11.

BERRY, JOHN N.
To catch a thief. *Library Journal,* vol.90, no.7, 1 April 1965, p.1617–21. Electronic device to prevent pilfering from libraries.

ELECTROSTATIC microfilm regeneration. *Reproduction,* vol.2, no.3, March 1965, p.22–4.

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The library of the International Atomic Agency. *Revue Internationale de la Documentation,* vol.32, no.1, Février 1965, p.16–18.

MOLGAARD'H, RASMUS
Objective, organisation and conclusions of the Elsinore Conference. *Revue Internationale de la Documentation,* vol.32, no.1, Février 1965, p.2–6.

POLZOVICS, IVAN
Pour le 300e anniversaire de la fondation de l'information scientifique. *Revue Internationale de la Documentation,* vol.32, no.1, Février 1965, p.23–6.

RANGANATHAN, S. R.
Classification of linguistics. *Library Science,* vol.1, no.3, September 1964, p.197–223.

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Rising tide of paper. *Advancement of Science,* vol.21, no.91, September 1964, p.279–85.

VASWANI, P. K. T.
Mechanized storage and retrieval of information. *Revue Internationale de la Documentation,* vol.32, no.1, p.19–22.

VERRY, H. R.
Document reproduction. *Revue Internationale de la Documentation,* vol.32, no.1, Février 1965, p.27–32.

MEMBERS' ADVERTISEMENTS

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WILFRED E. GOODAY, ARSM, DIC, MIMM, FIL. Member of Translators' Guild. Rumanian and French. 161 Rivermead Court, London SW6. Renown 1912.

TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London, NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. LABurnum 7723.

TRANSLATOR OF SCANDINAVIAN LANGUAGES, ten years' experience. Member of Translators' Guild. J. T. Craddock, Ekard, Ray Park Avenue, Maidenhead, Berks. Maidenhead 24931.

IBM TYPING SERVICE for lists, catalogues, handbooks, data sheets, etc. G. C. Jones, 154 High Street, Lee-on-the-Solent, Hampshire. (Tel. Lee-on-the-Solent 79337).

Appointments vacant

A EUROPEAN TRADE ASSOCIATION situated in South Sweden has a vacancy for a TECHNICAL INFORMATION OFFICER. The candidates must be able to fulfil the following conditions: have a university degree and a diploma in librarianship, experience in the modern uses of cement and concrete. Besides English a good knowledge of French and also knowledge of German is needed. The position involves: Responsibility for the information services; co-operation on library services amongst the associates; organizing of contacts with documentation institutions; collection and exchange of information and promotion material such as literature, films, photographs, etc.; editing of reviews and publications. Please apply in writing to: Cement and Concrete Association, 52 Grosvenor Gardens, London SW1.

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Candidates should be qualified male librarians with a science or technical background and, preferably, experience in a technical library. Salary will be in the range applicable to Science graduates with recognition of experience.

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ASSISTANT DIRECTOR

responsible to the Project Director, T. M. Aitchison, B.Sc., A.L.A., for the day-to-day administration of the above Project and for the control of the Project staff is required.

The appointment will be for three years, initially, commencing on 1st September, 1965. The salary will be in the range £2,000–£2,500 p.a.

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(2) Qualifications or considerable experience in technical information.

(3) Systems and programming experience.

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National Electronics Research Council,
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a technical librarian

is required for a small but expanding library. The work includes classification and filing of books, journals and papers; also the circulation of journals and the provision of technical information to a wide range of personnel in the Thorn group, including radio and electronics interests as well as lighting. A qualification in librarianship is desirable, also one in physics, mathematics or chemistry (preferably a degree). Knowledge of German would be valuable. The work is interesting and very varied, and is constantly increasing in scope. Working conditions are good (five-day, thirty-seven-hour week and the usual amenities). A commencing salary up to £1,100 will be paid, depending on the applicant's qualifications and experience.

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Imperial Chemical Industries Limited,
Pharmaceuticals Division,
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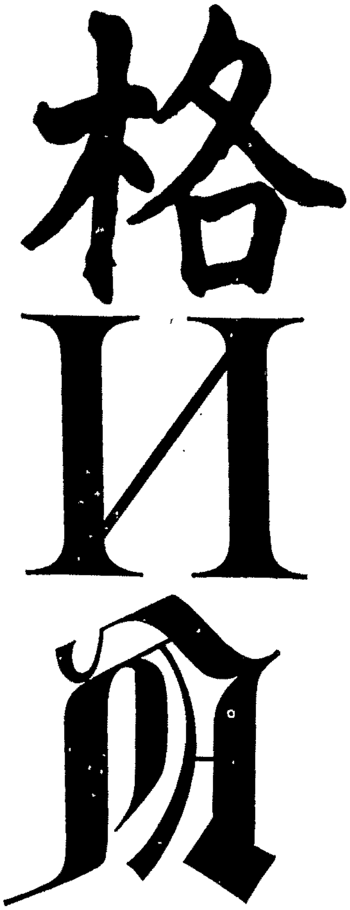

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Volume 17 **July 1965** **Number 7**

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July
TUE.20. Visit to Port of London Authority.

September
WED.29 – FRI.1. 39th Annual Conference at University of Keele.

October
WED.13. Course on handling Soviet and East European materials begins.

Miss M. Gosset

Miss M. Gosset, M.B.E., B.SC., A.R.C.S., who is well known to members of Aslib, has retired this month from her post as Librarian of the Atomic Energy Research Establishment, Harwell. Aslib owes Miss Gosset a debt of gratitude for her active support, advice and service over many years. She was a member of Council from 1949 to 1957, and from 1961 until she retired from it in 1965; and has served many times on Aslib Standing Committees, notably International Relations, from 1956 to 1964, Conference and Meetings for several years, the 1964 Conference Committee, and the Executive and Finance Committee, in 1964. She has represented Aslib since November 1945 on the BSI Universal Decimal Classification Committee (OC/20/4) and took a prominent part in the development of new schedules for nuclear science and technology.

Before going to AERE, Miss Gosset was on the staff of the Science Museum Library, from 1926 to 1946. There she worked with Dr S. C. Bradford, and played a large part in the Science Library's changeover to UDC in 1927.

In September 1946, she went to establish and take charge of the AERE Library (then under the Ministry of Supply, and from 1954 under the UK Atomic Energy Authority). Between 1947 and 1949 one of the early experiments in mechanized information retrieval using Hollerith punched-card equipment was carried out there; this was reported in *Aslib Proceedings,* May 1952. In May 1960 the new library building at Harwell was completed and has been described in the *Library Association Record,* February 1961.

Miss Gosset was always particularly interested in international library relations. She took part in the first meeting of FID in London in 1928, and ten years later became the Organizing Secretary for the Joint Meeting of FID and Aslib in Oxford and London. Her interest in international relations has continued throughout her career.

Miss Gosset was invested with the M.B.E. on 10th November 1964. Aslib wishes her every happiness in her retirement; it is hoped that she will still have time to join her many friends at conferences and meetings in the future.

Aslib's New President: Lord Kings Norton

Sir Harold Roxbee Cox, now Lord Kings Norton, was installed as President of Aslib in succession to Lord Shackleton at the Annual General Meeting held on 9th June. Lord Kings Norton is Chairman of the Metal Box Company Limited, an active member company since 1948, and was, until the dissolution of DSIR, Chairman of the Council for Scientific and Industrial Research. One of his principal interests has always been technical education and his work as Chairman of the Council for National Academic Awards will undoubtedly bring him into close touch with many of Aslib's interests in this field. A few days after his induction, Sir Harold's name appeared in the Birthday Honours List as a recipient of a life-peerage; we are thus able, at one and the same time, to offer him our warmest congratulations on this sign of Her Majesty's favour and our welcome to a term of office which we trust will be as enjoyable to Sir Harold as it will certainly be beneficial to Aslib.

To the disappointment of all present at the Annual General Meeting, it was not possible for Lord Shackleton to attend because of absence in Canada in fulfilment of his duties as Minister of Defence for the Royal Air Force. Grateful thanks are due to Lord Shackleton for the interest, energy and enthusiasm which he brought to the office of President during his two years in the post. He has served Aslib with great distinction and worthily upheld the traditions set by a long line of distinguished Presidents.

Vice-Presidents of Aslib

Members will be pleased to know that Sir Owen Wansbrough-Jones, who is now Executive Vice-Chairman of Albright & Wilson Limited, has agreed to serve for a second three-year term as a Vice-President of Aslib. We are glad to have his continued interest and support.

Sir Norman Kipping, Director General of the Federation of British Industries, has unfortunately come to the end of his two terms of service as a Vice-President, the maximum permitted by Aslib's Articles. He has been succeeded by Vice-Admiral Sir Frank Mason who, in addition to his connexions in private industry, is Chairman of the Steering Committee of the National Engineering Laboratory at East Kilbride. Sir Frank, who was President of the Institution of Mechanical Engineers last year, is also a member of the Council for National Academic Awards where he sits under the Chairmanship of our President, Lord Kings Norton. We welcome Sir Frank into this closer association with Aslib and trust that he will enjoy his participation in our activities.

Honorary Officers of Aslib

At the Annual General Meeting on 9th June, Mr D. T. Richnell retired from the Honorary Secretaryship of Aslib, an office he had held with distinction for five years. Grateful thanks are extended to him for his generous service, which is much appreciated. He has been succeeded as Honorary Secretary by Mr J. R. Stocks, of the Shell International Petroleum Company Ltd, who has already helped Aslib in many ways and whose election to this office is warmly welcomed. Mr A. H. Holloway has been re-elected Honorary Treasurer for a second year and we are most grateful to him for his continued help.

Elected Members of Council

A welcome is extended to Mr C. E. C. Hewetson, Mr R. Moss, Mr W. H. Rutherford and Mr W. L. Saunders, all of whom will be serving on Council for the first time as a result of this year's elections. The other six successful candidates have all given periods of service on the Council in the past and Aslib is deeply appreciative of their continuing interest. They are: Messrs. C. W. Cleverdon, H. H. Goom, D. T. Richnell, F. H. Smith, K. D. C. Vernon and G. H. Wright.

Scottish Branch

The Scottish Branch of Aslib held a highly successful and well-attended meeting in the University of Strathclyde on Wednesday evening, 19th May. Mr Wilfred Ashworth, of ICI Fibres Limited, delivered a most entertaining and informative address entitled 'Happiness is a smart librarian'. The discourse was copiously illustrated with a series of aptly chosen lantern slides, and

Mr Ashworth held his audience spellbound. The Branch Committee hope that it will be possible to arrange similar occasions, based on lectures already presented at Headquarters meetings, at regular intervals from now on.

Textile Group

The Annual General Meeting of the Textile Group was held at ICI Ltd, Dyestuffs Division, on Monday 10th May. After the business meeting a member of the Dyehouse staff gave a talk on 'Instrumental match prediction', the ICI colour matching service, followed by a short film. Twenty-three members attended.

National Survey by OSTI

The Office for Scientific and Technical Information (OSTI) has recently launched a national survey of staff employed on scientific and technical information work in order to ascertain such facts as the numbers employed on such work and their background training. From the findings OSTI hopes to make some estimate of future demand for staff and the educational facilities needed to meet it.

Two questionnaires are being used for the survey—one for management and one for information staff. In order to preserve anonymity, the Office is not asking for the names of either organizations or individuals. It hopes that members of Aslib engaged on such work who have not received notification of this survey will apply for the appropriate questionnaire. The address is Office for Scientific and Technical Information, State House, High Holborn, London WC1 (telephone Chancery 1262).

This survey is clearly of great potential significance and Aslib trusts that its members will co-operate fully in its successful completion.

Library and Information Sciences Exhibition

An exhibition of recent literature on the library sciences, with special emphasis on documentation and information handling, is being held by Robert Maxwell & Co. at Oxford from 29th to 31st July. This will coincide with a display of new library servicing and warehousing facilities for use in their new building. Particulars may be obtained from the Documentation & Supply Centre, Robert Maxwell & Co. Ltd, Waynflete Building, 1–8 St Clements, Oxford.

Scientific Policy and Economic Growth

This is the title of a conference programme arranged for 31st August to 25th September at Woolton Hall, University of Manchester. There will be a similar programme from 29th August to 26th September 1966. This is planned to meet the needs of senior industrialists, government officials and academic staff who are concerned with problems of policy relating either to science and technology or economics and finance, or both. Representatives from the United Kingdom and from overseas will be taking part. Further information may be obtained from Avice V. Turnbull, Overseas Administrative Studies, University of Manchester, Oxford Road, Manchester 13.

Documentation Seminar, Bangalore

The third annual seminar of the Documentation Research and Training Centre will be held in Bangalore in December 1965. It will be under the direction of Dr Ranganathan and the theme will be design of classification. The probable dates will be 19th to 23rd December and the Documentation Committee of the Indian Standards Institution will meet in Bangalore on 18th December.

Details of the programme may be had from the Convener of the Seminar, Documentation Research and Training Centre (Indian Statistical Institute), 112 Cross Road 11, Malleswaram, Bangalore 3, India.

Library of Congress Tenth Report

The tenth *Annual Report of the Library of Congress* was published in June. Mr L. Quincy Mumford, Librarian of Congress, describes 1964 as 'a year of records', with greater increases than ever before in the Library's history in, for example, the printed catalogue card service, sales of technical publications, and services to scholars in the humanities, science and law. The decade has seen the establishment of the National Referral Center for Science and Technology, the expansion of the Library's Science and Technology Division, and the publication of the *National Union Catalog* in cumulative volumes. Copies of the Report may be ordered from the Superintendent of Documents, Government Printing Office, Washington, DC 20402, price $2.25; they are available to libraries free of charge, on request to Publications Unit, Library of Congress, Washington, DC 20540, USA.

Patent Office File Lists

As from the publication of Patent Office Specification no. 1,000,001, changes are being made in the way in which subject-matter file lists are issued. These changes were necessary to maintain file lists back to specifications published in 1911 and hence to provide continuity with the subject-matter index for the period 1861 to 1910.

The following are the File Lists which will be available:

(i) *File Lists Series A* will be available for each code mark in the Classification Key operative from Specification no. 960,001 to 1,000,000, and will not reflect subsequent classification changes. These lists will be available as before and will include all specifications from 1911 to no. 1,000,000 indexed under the relevant mark.

(ii) *File Lists Series B* come into operation on 1st July 1965. These lists will include specifications back to no. 1,000,001 *only* and will be supplied for any code mark in the *current* Classification Key (which until Specification no. 1,050,000 will be the key issued in May 1965 and operative from Specification no. 1,000,001).

(iii) *File Lists Series C* will be available for each code mark in the *current* Classification Key for certain headings (or part headings), particulars of which may be obtained from the Patent Office. These lists will include specifications published over the last fifty years or for periods otherwise stated.

(iv) *File Lists Series D and Series E* will provide a new service in respect of certain headings (or part headings) as in (iii) above for any combination of code marks up to a maximum of twenty-five in any *one* heading (or an indicated part of it). It is emphasized that this new service is only experimental and may be withdrawn at any time upon notice in the *Official Journal (Patents)*.

Inquiries for full details of headings and prices may be made to the Printing Branch, Patent Office, Room 639, State House, High Holborn, London WC1 (telephone Chancery 1290, ext. 967).

Institute of Information Scientists Publication

The *Proceedings* of the First Conference of the Institute of Information Scientists, held at Merton College, Oxford, in July 1964, are now available on sale, price 20*s* (10*s* to members of the Institute). Orders together with remittance should be sent to Mr S. R. Loynes, c/o Wiggins Teape Group Research Organization, Butler's Court, Beaconsfield, Buckinghamshire.

North-Western Polytechnic Courses

Part-time courses in librarianship have now been announced by the North-Western Polytechnic for 1966. There will be a course for the LA Entrance Examination on Tuesday mornings from January to November; the course fee is 42*s* plus student membership fee 2*s*. (Students under twenty-one years, released from employment to attend this course, are exempt from the course fee.) From January to December there will be a daytime conversion course, final year, for students who have substantially completed qualification by parts of the old Registration syllabus. The fee is 48*s* (or 66*s* for two attendances a week) plus student membership fee 2*s*. There will be two long-term courses beginning in January 1966, one for Parts I and II, extending to at least five years with an attendance of approximately two half-days a week; and one two-year course for the Postgraduate syllabus, with an attendance of about six hours a week. The fees for both of these are the same as for the conversion course.

Enrolment for the Entrance Examination course will be on 11th January 1966. Applications for all the other courses must be made in September 1965; all inquiries and requests for application forms should be sent to the North-Western Polytechnic School of Librarianship (Part-time studies), Prince of Wales Road, London NW5, as soon as possible.

ASLIB COUNCIL MEMBERS 1965–6*

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Lord Kings Norton
IMMEDIATE PAST PRESIDENTS:
Professor Sir Lindor Brown
Lord Shackleton
VICE-PRESIDENTS:
Vice-Admiral Sir Frank Mason
Sir Reginald Verdon-Smith

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* Members of Aslib Committees for 1965–6 will be announced in the August issue of *Aslib Proceedings*.

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Sir John Wolfenden

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CO-OPTED:
Sir Frank Francis (Director and Principal Librarian, British Museum)
F. E. Wallwork (Chairman of Aslib Group Officers' Committee)
Miss M. F. Webb (Head of Library, Patent Office)

DES NOMINEE: Professor J. D. Bernal (University of London)
DES (OSTI) OBSERVER: A. P. J. Edwards

PROBLEMS OF INFORMATION RETRIEVAL

HELEN M. TOWNLEY, B.SC., A.I.INF.SC.

*Senior Systems Analyst of Information Retrieval, I.C.T. Ltd**

Aslib Biological Group Conference on Mechanized Retrieval, Cambridge, 23rd October 1964

THERE are seven major problem areas in this field, one of which has been treated extensively and will get no attention from me today—the language problem. I do not propose to go into the minutiae of pre- or post-co-ordinating, of the merits of role relations, interfixing, weighting and the like, though there are some points which merit consideration in the context of this paper, whose aim is to consider some of the practical problems likely to be met. The seven problem areas are:

1. Decision: convincing yourself and your management.
2. What sort of mechanization.
3. Language.
4. Generating the data.
5. Storage and filing.
6. Controlling your users.
7. Controlling your staff.

Making the decision

Mechanization is not the inevitable consequence of dissatisfaction with one's existing service—with the service you give your users: this could well be the reasonable dissatisfaction that any over-conscientious person feels about his work. All of us need to review the service we provide, especially in terms of the time it takes to respond to requests for information. What percentage of them can be answered in five minutes; fifteen minutes; half a day; a day; more than a day? How valuable is the information which takes more than half a day to retrieve (the utmost tact is needed here!)? How sufficient are the answers given? Users must be honest in admitting the number of times we have failed them; librarians must ask themselves how often they have given a really complete answer when users complain of references insufficiently detailed or too widespread.

Is the information officer a positive force in his laboratory? Is his library a real library or only a filing place? What, in brief, do his users really think of him?

I cannot lay down any easy generalization or rule-of-thumb for mechanizing at or above such-and-such a point. In some cases it is necessary with a collection of ten thousand documents; in others it is unnecessary with a collection of eighty thousand. In general, it is depth and complexity of search, rather than mere volume, which dictates mechanization. One must evaluate the cost—in library staff's time, and in users' time and efficiency—of delaying retrieval or of failing to recover information which was actually available. It often seems that it is only for about 5 per cent of questions that a mechanized retrieval system justifies itself, and if managements are asked to spend a lot of money just so that 5 per cent of the service can be done more efficiently they are apt to return a pretty dusty answer. This 5 per cent must be evaluated in terms of time, money and 'research potential'—one must look into the future, visualizing how information is going to 'explode' in one's field and to what extent mechanizing now will save agonizing trouble with the backlog which would accumulate in the years before mechanization became inevitable.

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* International Computers & Tabulators Ltd.

What sort of mechanization

a. For retrieval

Equipment for retrieval runs from the simplest of column-at-a-time sorters to computers. An excellent service can be rendered by a column-at-a-time sorter, made possible by the fact that the bulk of the collection fits easily into a very few classes of UDC, but is well spread between these classes. The careful subdivision of the file into a large number of sections cuts down sorting time.

The pattern selecting sorters are normally more suited to co-ordinate indexing, usually on the principle that one punching position represents one descriptor, thus limiting us to 960 descriptors; but, in fact, much greater flexibility is possible. For instance, we can accommodate the whole of the plant kingdom in less than half a card; one group of positions represents Class, one Family, one Genus and one Species; the Class group includes as many punching positions as there are Classes; the Family as many punching positions as the largest number of Families in a Class; similarly there are as many Genus punching positions as there are Genera in the largest Family, and species as there are species in the largest Genus. Thus a 1 punched in the Genus group would represent *Caltha* if the Family position punched was that of Ranunculaceae, but *Paeonia* if the Family punching was for Paeoniaceae.

On the big pattern selecting sorter, the ICT 335, it is possible to have several cards for one item, searching over them as if they were a length of 12-channel tape.

With all the punched card retrieval systems care has to be given to the card layout to get the best use of the available punching positions; but it is a mistake to believe that with punched card retrieval we are of necessity restricted to a small number of descriptors.

With punched card retrieval systems we must consider the question of output. An abstract can of course be carried on the back of a card and the questioner, coming into the library, can be given the abstract on the spot. But if the information has to go a little distance one does not want the card to leave the installation and must consider whether to *a*, list off the reference numbers mechanically on a tabulator or card-reading typewriter; *b*, carry a microfilm in the card, and reproduce thence; *c*, carry some information in a form from which it can be duplicated—the spirit duplicator manufacturers, for instance, can provide means of running off lists from cards. With the 335 sorter it is possible to print author, title, source, etc., direct from the card, and here the problem is to weigh the value of the columns used for print information against their value for carrying descriptors.

With punched card retrieval it is the librarian who will have to make the decision—'What equipment do I need?'—but it is most unlikely that he will have this freedom of choice with a computer.

b. Current awareness

In my experience, many people who want to improve their current awareness service do not really have any idea of how they want to do it.

Selective dissemination has not, as far as I know, been operated from a punched card installation; and I do not know any computer SDI systems in this country. If you already have a computer IR installation, the cost of SDI is directly proportionate to the number of profiles—most profiles are fairly simple and the matching process is not a problem in itself, though the organization of an SDI programme is difficult when there is a large number (say, 250 or more) of profiles to match against an accession rate of over about three hundred a week.

KWIC indexes and their relations are still under some suspicion, especially where titles are grossly uninformative! This can be overcome by adding a descriptive phrase to the title; and we are planning to amend ICT KWIC to give a descriptive sentence for permuting in the KWIC instead of the title, but with the title proper given in the bibliography section of the output. It must be remembered that KWICs do not create themselves: you must prepare the information for input to the computer, and unless there is an intelligent punch operator who can work direct from the documents you will need to allow time—about twenty-five documents an hour—for getting it into punchable form.

The same warning applies to the use of computers to generate accession lists, catalogues, 5 in. × 3 in. cards, etc. When calculating times do not forget to allow for the preparation of data. Preparing the input material in an acceptable form is an additional chore, and when considering mechanizing this process you must make due allowance for the fact that you and your staff will have to accept some new disciplines in the way in which the information is ordered.

Language

I want to repeat here a warning I have given elsewhere—do not fall into the trap of making retrieval language suit the collection rather than the users of the collection. In generating the language one should make use of one's users: get them to say how they would index a paper; and give the same paper to a number of them with differing interests. One should be sure, too, of knowing what sort of results they are looking for. We all know by now the result of the Cranfield investigations—there comes a point at which we can improve relevance only at the expense of recall and we must find out beyond any doubt which matters most to our users.

A language cannot be chosen *in vacuo*—it has to be fitted to the equipment chosen. All the manufacturers will be prepared to help in formulating a language; take full advantage of them!

Above all, we should not underestimate the problem of generating a retrieval language. When the manufacturer says that a machine will not be ready for several months, we can breathe a sigh of relief; if the equipment arrived next day we should be spending anxious hours working out the best way of telling the management why we had not got under way at once. A conservative estimate is about nine to eighteen months. For some lucky people the subject has already been more or less covered in some classification scheme or thesaurus already published—but even then there is a strong probability that it will not have just the right emphases and nuances for one's own users: and no two collections of scientists have precisely the same purpose or, therefore, precisely the same needs.

Finally, it is important to make up one's mind just what it is one wants to retrieve. We talk glibly about 'information retrieval', but this phrase covers:

fact retrieval (the output is a fact, e.g. the boiling point of water is 100°C);
reference retrieval (the output is a bibliography);
abstract retrieval (the output is a bibliography with abstracts);
document retrieval (the output is the text of the documents);
information retrieval (the output is informative sentences extracted from the documents);
information correlation (the output is a statistical evaluation of the stored information).

Which of these are you aiming at? Unless you have clarified your thoughts on this you are in danger of generating a hybrid sort of system.

File organization

In some cases there is no option but to select one or another form of file organization: with feature cards one has to use inverted filing, like it or not; with a pattern selecting sorter item filing is nearly always essential. With a computerized retrieval system there is free choice and a number of interrelating factors must be assessed. The following table may help:

	DIRECT	INVERTED
Operating times	Faster for updating but slower for searching.	Slower for updating but searching is faster, especially if random access devices are available.
Logic levels	As many as desired in exceptional cases but time increases considerably if the number of levels of logic in a search inquiry exceeds six or seven.	A limit must be set to the number of logic levels. There will be considerable difficulties in making this more than five.
Logic	The logical operations 'AND', 'OR', 'NOT', 'OUT OF', 'BETWEEN' are easily provided.	The logical operations of 'OR', 'AND', 'NOT' are easily provided but 'OUT OF' and 'BETWEEN' present problems of storage and programming.

Working storage	No problems.	A storage field has to be allocated for each level of logic. The size of this depends on the maximum number of items in which a descriptor occurs.
Backing store	Suits magnetic tape systems.	Suits random access systems.
Descriptor	Size of descriptor has marked effect on time per search.	The representation of the descriptor does not affect the computer time required.
Language	Relationships between descriptors easily effected. Weighting is possible.	Relationships between descriptors can be shown but not with such ease as with direct filing. Weighting adds so much to the operating time as to make it impossible.

Generating the data

Creating an IR system is not, as one potential user once assumed, merely taking the current 5 in. × 3 in. cards and putting them on to (in this case) magnetic tape. Mechanized retrieval is more subtle and complex than retrieval from a pack of 5 in. × 3 in. cards, and needs more careful indexing. Will additional indexing staff be needed? What steps will be taken to ensure (if there are several indexers) that uniformity of indexing is maintained? One installation issues a printed word list on which the indexer ticks off the words to be used for each document; once a month the order of the words in the lists is changed so that the indexer is to some extent prevented from getting into a rut and over-using some words while neglecting others, simply because he has, once a month, to read through the whole word list to find what he wants. It is a good plan to keep a record of the terms used by an indexer to find out whether he has got into such a rut; the check will also reveal, for instance, whether he is neglecting some aspect of the subjects covered; a botanist may index in detail the biological aspects of a paper but cover only negligibly some physical or mathematic aspect.

We have then to face the problem 'What shall we do about the backlog?' I can give little guidance since this is a very subjective decision. But remember that including the backlog means re-indexing a lot of material, punching it or otherwise preparing it for the mechanical device. How far back is one going to go? Is there some natural divide in the subject, some epoch-making discovery which more or less forces one to include material since then in the retrieval material? Is one going simply to assess the cost of indexing and preparing the material and allow £X-worth, which will cover approximately the last Y years? Or is one going to be ruthless and say firmly 'Anything received up to 5 p.m. this evening goes in the present system: anything received after that to be indexed and recorded and retrieved by the new system'?

It should be remembered, too, that the conversion of the indexed information must be organized into the form required by the equipment; the data must be laid out in a form from which they can be easily read by the operator; the librarian may have to design a layout to which the indexer must conform.

Verification is important; there are standard routines for verification of paper tape or conventionally punched cards; but where the '960 binary punched positions' are used, the manufacturers' verifiers are not always effective where there are more than four holes per column. Nor, indeed, are they often necessary: with accessions of less than about two hundred a week it is often sufficient to mark the positions to be punched with a felt-tipped pen and then punch them; marks without a hole in them, or holes without a surrounding mark, are suspect, but a mark with a hole in it is correctly punched—simple and very effective.

A problem can arise in making sure that the right written data go on to the right card. For microfilms mounted in the card this can be assured by using a mounting device holding the films in ordered sequence, and sorting the cards into the same sequence before putting them on to the machine. Where information is hand-written or typed on to the back of the card special care is necessary.

I am often asked what is the life of a punched card used for retrieval; unfortunately I cannot give an answer—certainly ordinary punched cards can have a life of one thousand or more passages through the machine, but operator efficiency has a bearing on this—bad handling of the cards can reduce their life appreciably. They must be fed carefully into the machine, properly 'joggled' and their leading edges especially must not be damaged. They should be carefully filed in containers designed for the purpose. Punched tape similarly needs careful handling and this quality of carefulness must be looked for in choosing staff for the job. The care of magnetic tape, magnetic cards, etc., is not likely to be the librarian's responsibility—he can leave it to the computer operators.

One of the points a programmer has to watch out for is file security: an initial part of any programme deals with checking that the right file is being read and, just as important, that new material or amendments to existing data are going on to the right file. In a punched card application equal care must be exercised over the correct filing of cards for new material, and new data for existing cards must be punched on to the right card.

Questioners

All present-day IR systems use an artificial language to define the contents of a document: questions must be put in this same language, and it is therefore generally necessary to interpose one of our own staff between the questioner and the system—it is no good putting in an inquiry for Apes if the indexing language never went into more detail than 'Primates' when the documents were entered into the system. We are, of course, already familiar with the other problem of dealing with a questioner—that we must get him to be sure he knows what he wants to ask! The man who comes along with a very widely expressed question, when in fact he wants to ask for something highly specific, is a menace at all times, but when his question is being put to a mechanized system he will blame failure to retrieve just what he wants not on himself but on the system, and bring the new tool into disrepute. The need to interpose a 'translator' from his language to machine language gives us the excuse we need for probing into his question and getting over this particular headache.

With computer retrieval the problem is not so acute: a large number of 'natural language' words can be stored in the computer and a sort of dictionary look-up can convert his words to the words used by the system; but there is still the problem of the questioner who cannot express his question correctly, and generally speaking I would recommend in this case, too, that a skilled member of staff intervene between him and the machine.

Operating

Operating a sorter is easy; plugging one of the smaller pattern selecting sorters is easy; plugging the larger sorters needs care and training. I would suggest an A-level person to take charge of the sorter and its operators (actually, except for a very large installation, a separate operator is not necessary—using the machine is a sort of by-product activity and the actual operator can have a number of other routine functions). But it is probable that an ordinary clerk will not take kindly to being asked to operate a sorter unless she is introduced to it with care—standing by the side of a machine watching cards running through it is a boring occupation.

I am guiltily conscious that I have said more about problems than about their solution. But the truth is that most of them depend for their solution on good management—management of staff, of work flow, of users. My aim has been not to offer solutions in advance of knowing the individual circumstances, nor, most emphatically, to frighten anyone off mechanizing. We all have a right to call on the manufacturers to provide someone to advise us in our own particular circumstances, and if this talk has shown the sort of questions we must ask them, I have done all I meant to do.

AN ECONOMIC INFORMATION SERVICE FOR MANAGEMENT

I. G. ROSS, B.A.

ICI Fibres Ltd, London

Aslib Engineering Group Conference on Industrial Market Research, London, 21st January 1965

IN this paper I propose first of all to analyse the type of information required by management; secondly to give some indication of the availability of this information, both in the United Kingdom and overseas (suggesting at the same time how this information can sometimes be supplemented by the company's own effort); and finally to say something about the building up, storage and dissemination of commercial information based largely on our own practice.

The ultimate aim of any economic information service, as I see it, is to supply management with up-to-date and reliable information as a basis of decision making. This may be either in the form of direct information to management or indirect as the basic data for market research and sales forecasting.

Now the type of sales forecasting organization which a company sets up is a highly individualized matter, dependent upon a number of variables. It depends, for example, upon the type of product produced and the type of market for which it is produced. Does the company, for example, manufacture goods which are sold through normal distribution channels direct to the public, or does it manufacture components used by manufacturing industries? Whatever the product or whatever the market, I think it is possible to distinguish four basic groups of data which it is the function of an economic information service to supply. These are: 1, economic data; 2, industry data; 3, data on competition; 4, data on the internal activities of the company.

1. *Economic data*

All companies are affected to some degree by the economic climate in which they operate during the forecast period. The textile industry, in particular, is very sensitive to changes in the level of economic activity, and although it is not possible to predict exactly what is likely to happen, an understanding of economic principles and a watch on the basic economic indicators will help materially.

2. *Industry data*

Most industries experience some form of cyclical movement. Changes in the level of activity within the industry can take place for a variety of reasons. It may be caused by a seasonal, speculative or other temporary factor which will adjust itself, or it may spring from some more permanent cause. In order to analyse the significance of these changes and to compare their experiences with others, manufacturers, for example in the textile industries, need statistics in the short term on such matters as machine activity and output, prices and margins, labour movements, and stocks of both raw materials and finished goods. For long-term planning such as investment policy the manufacturer needs information of a different order. Before building up a new plant, for instance, he must evaluate the future demand for his product in order to gauge the capacity required. Figures for the availability and future supply of labour are wanted in deciding where to site the factory. In the textile industry there are also fairly violent cyclical movements. The belief grows that business is bad and there is a frantic running down of stocks; in actual fact final consumer demand remains fairly constant, but because of the length of the chain between the producer and consumer these movements take place at regular intervals and it is very important to be able to watch the stock position. The whole matter is one of business confidence and the periodical business pessimism is one which is really justified. I believe that the footwear industry has similar cycles; here the recessions seem to occur at four-year intervals, and have in fact occurred in 1954, 1958 and 1962, the next one being due in 1966. In this industry, too, business confidence plays an important part although such unpredictable factors as weather or changes in fashion are also contributory causes. It is important for anyone attempting to do sales forecasting to try and determine at what point of the cycle the company is at the time of the forecast. Generally speaking, an individual company usually follows the trend of the industry, and it is therefore essential to follow the developments of the industry as a whole. These remarks apply not only to the industry of the forecasting company but also to the end-use industries for their products. It is therefore essential for an economics information service to collect data about the industry and about individual companies within the industry.

3. *Data on competition*

In order to determine the forecasting company's prospects it is necessary to try to sense the company's share of the total market. It is therefore necessary to follow the activities of competitors, not only those who produce the same product but also those who produce competitive substitutes.

4. *Data on the internal activities of the company*

The other source of information which needs to be studied by an economic information service is the policy decisions taken by the forecasting company itself. In many large companies this information, unfortunately, is often considered to be so secret that no one should be told, or alternatively it often takes a long time to percolate downwards through the firm. It is obvious, however, that decisions taken at board level, whether they be a question of pricing policy or the introduction of a new product, have a marked effect on the company's share of the total market.

Before looking at the availability of economic information in this country and abroad, I should like to make some general comments.

Statistics of use in industrial market research come from two main sources:

1. Official statistics collected by governments and international organizations such as the United Nations, International Labour Office, Organization for Economic Co-operation and Development, and the Statistical Office of the European Economic Community.
2. Non-official statistics collected by private industry, trade associations, research organizations and similar bodies.

In this country the collection of statistics is governed by the Statistics of Trade Act; unfortunately, at the time of the passing of this Act, there was such an outcry by manufacturers and others about the disclosure of information likely to be of use to competitors that information which had been available for years, notably the 'L' returns of the Ministry of Labour, became no longer available. Furthermore, the Government is mainly concerned with the overall economic picture and as a result detailed statistics which are of the greatest use to the individual company are not available from Government sources. The fact remains, however, that the magnitude of certain tasks, such as the collection of statistics of national income and expenditure, and the Census of Production, Distribution and Population, means that they can only be carried out by governments, and as a result, since those statistics are the only source of information available, they have to be accepted in whatever form they are produced. Nearly always the amount of work involved results in their appearing months, and sometimes years, after the period to which they refer. For example, the latest annual statistics of trade for the United Kingdom relate to the year 1962, and the latest Census of Production to be published covers the situation as it was in 1958. Although various attempts are being made to speed up the collection and publication of statistical material, there is much justification in the statement that Government statistics are like an out-of-date railway timetable.

All the major countries collect some form of official statistics of use in industrial market research. These usually cover population, national income and expenditure, international trade, and some form of industrial statistics—although the latter in particular vary greatly in their usefulness from country to country. The normal pattern is for a country to publish, usually monthly and then in greater detail annually, summaries of the major economic indicators and statistical series in one comprehensive volume similar to our *Monthly Digest of Statistics* and the *Annual Abstract*. In some countries these are the only statistics published, but it is more usual for there to be summaries of more detailed statistics appearing elsewhere, in the various censuses, trade statistics, etc. Every major country collects some form of trade statistics—in most countries these are probably the oldest form of statistics compiled and, being closely associated with the collection of customs duties, are the easiest to gather.

Again, we usually find that these appear in greater detail in the annual rather than in the monthly volume.

Two points about trade statistics should be borne in mind. I have mentioned the restrictions placed in the United Kingdom on the publication of detailed statistics when these would reveal details of individual firms' activities; although this applies principally to production statistics, it also applies to trade statistics. (This holds good in other countries besides the UK, notably the Netherlands, where there is often only one major producer of a commodity.) What is sometimes forgotten, however, is that one country's export figures are another country's import figures and, whereas the exporting countries carefully lump statistics together in order to prevent disclosures, the importing countries are often not so meticulous and it is sometimes possible to obtain the required breakdown from another country's import statistics.

The other point is that we can sometimes obtain more detailed trade statistics than those which appear in the monthly returns. Detailed trade statistics for the UK are given in the Annual Statement of the Trade and Navigation and appear in published form very late, the current ones, as I have said, referring to the year 1962. It is possible, however, to obtain from the Customs and Excise, on payment of a small fee, provisional figures on a monthly basis, giving the annual more detailed breakdown of those sections with which a company is particularly concerned. In some other countries, although by no means all, it is possible to come to a similar arrangement with the Customs Department or Central Statistical Office of the country concerned.

Population statistics, generally speaking, take the form of a fairly detailed census, which is held usually once every ten years. Like other statistics, these vary from country to country. One important set of figures for market research is population projections; for the UK the most easily accessible source is the *Annual Abstract of Statistics*, which gives population projections for several years, broken down by sex and age groups. The major statistical offices have made population projections; most of them, however, are not published. Some of the international organizations publish population statistics, notably the UN in their *Demographic Yearbook*, but this publication does not include projections. Probably the best source is a fairly recent publication by the OECD, *Demographic trends in Western Europe and in the United States 1956–1976*.

In addition to population statistics, the UN Statistical Office publishes a wide range of statistical series.* In cases where there is a marked difference in the basis of collecting certain statistics, as for example national income statistics, the international body, in this case the UN, has tried to standardize the definitions and layout in order to make the figures comparable. The results of these efforts are published in the *Yearbook of National Accounts Statistics*. It is worth bearing in mind that in very few countries are statistics collected in a standard form; and for market research purposes, in those fields where a comparison is likely to be required, the information service should have available where possible any published material which makes comparisons easiest.

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* Some references were published as an appendix to an earlier paper of mine in *Aslib Proceedings*, vol. 14, no. 6, June 1962.

In the group of economic data, which I have suggested an information service for management needs to supply, I have so far concentrated on the general availability of statistical material of use in assessing the economic climate in which the company will operate either at home or in its overseas markets. This is satisfactory where a company has its own expert market research organization: generally speaking, recourse to primary sources, with the company's own interpretation of the basic economic data, is to be preferred. This in fact is the system we ourselves operate. I realize, however, that for many companies, for a number of reasons, this is not possible. In the event of this, recourse has to be made to secondary sources. There are a large number of organizations which produce regular surveys of the state of the economy both in this country and abroad. I would suggest that an information service would have these available, at least for the UK and for those countries which are of particular interest. For the UK I personally feel that the quarterly *Economic Review* of the National Institute of Economic and Social Research is by far the best. Another good source is the *London and Cambridge Economic Bulletin*—which also appears separately, as a supplement to the *Times Review of Industry and Technology*.

As far as overseas countries are concerned, very good sources for a broad outline are the Federation of British Industries Country Surveys, reports issued by Barclays Bank Economic Intelligence Department, and to a lesser degree some of the reports issued by the Board of Trade Export Services Branch.

For more detailed surveys both the UN and the OECD produce either annual or quarterly surveys and most of the principal banks, either central or commercial, in the major countries produce regular economic appraisals. Of particular value is the quarterly report published by the Economic Intelligence Department of the European Economic Community, which reviews the state of the economy and prospects in each of the EEC countries. This is also brought up to date in a special monthly series. Other sources include the three-monthly reports issued by the Economist Intelligence Unit.

When we consider the second main data group which an information service should supply, that is industry data, we run into a considerable amount of difficulty. The main official sources of data for the UK are the Censuses of Production, which have been held at intervals since 1907, and more recently the Board of Trade Business Monitor Series, formerly the KS Returns.

In the post-war years Censuses of Production have been held in 1948, 1954 and 1958, with a combined sample census covering the years 1955, 1956 and 1957. Two main difficulties are encountered when an attempt is made to compare one census with another. Firstly, on several occasions the Standard Industrial Classification, which is used as the basis for grouping establishments, has been altered; and secondly the geographical area covered by the census has varied. In some pre-war censuses this has included Great Britain and the whole of Ireland, on other occasions it has covered Great Britain and Northern Ireland, while in 1948 the census covered Great Britain alone. The last census relates to the year 1958—already considerably out of date—although a new full census was held in 1964 and it is hoped that the provisional results will be published in 1965. It is now proposed that between the full censuses an annual sample census will be held which will be simpler than any taken previously, information being collected about three items only—value of goods sold and work done, stocks, and work in progress and capital expenditure.

In spite of all these difficulties, the fact is that the census remains, in many cases, the only source of production figures for a large range of goods, although in some instances more useful statistics are collected by various trade associations. This, however, is still comparatively rare. Certain parts of the full census are of more use than others. One section is concerned with materials and fuels purchased by each industry and is useful for giving some indication of the supplies necessary for any expansion of final output. It also enables us to trace the relation between industries, and in particular to see who are the main customers for a particular product. If, for example, we take cotton yarn, by extracting figures of cotton yarn purchased whenever they appear in any trade we can get a picture of each industry's consumption of cotton yarn and their relative importance as customers of the cotton spinning industry. Some of the yarn, however, may be imported and there is no indication as to what percentage is from home production and what from imports. This factor can be obtained from the Trade and Navigation accounts. Secondly, some of the yarn may be sold outside the field of industrial production: in the case of cotton yarn, as sewing thread to the final consumer; or as cotton yarn exported, which will not therefore appear as material purchased by other industries. But even with this qualification the census will throw considerable light on the markets for industrial products.

When we turn to overseas countries we find that production statistics, like all others, vary considerably from country to country. One of the difficulties is that some of the smaller countries have the same difficulties as we have in this country over the non-disclosure of individual companies' results. This applies particularly to the Netherlands, although recently there has been considerable improvement in the actual contents of their censuses of production, which have been completely revised. In Switzerland there is extreme reluctance on the part of manufacturers to disclose any form of statistical information, so one finds that here there is virtually no census of production. In Italy, although there is a census of production, it is really only an enumeration of establishments. I have in fact seen the original questionnaire which is held once every ten years and no questions are actually asked on industrial output. In Germany and the Netherlands, on the other hand, production figures are extremely good. In Germany they appear on a quarterly basis, very soon after the quarter concerned has ended. In the United States very detailed figures are available, both in the annual census of manufacturers and also in the current industrial reports which were formerly the 'Facts for Industry' series.

It is worth bearing in mind that the EEC collects industrial production statistics from each of the member countries. They appear in its publication *Industrial Statistics*, produced quarterly. In this the community has tried to standardize the information available so that one country's output can be compared with another. It is also useful in that if one finds, for example, that no figures exist for Italy, then one can be pretty sure that none are collected. If, on the other hand, you find statistics for another country, for instance Germany, more detailed statistics can probably be obtained from the production statistics of the country concerned. One thing to remember is that from time time the EEC Commission publishes special studies on particular industries. Recently there was a survey of the rubber industries, and statistics not readily available relating to consumption of rubber by particular end-users were made available. There was also a considerable amount of information about the structure of the actual industry.

Another source of production statistics for the UK is the Business Monitor Series of the Board of Trade. Up to about three years ago there was no equivalent in this country to the Current Industrial Reports which I have mentioned. It was possible to obtain certain information (some or all of which was later published in the *Board of Trade Journal*) from the Board of Trade in the form of KS Returns. These, however, had to be specially requested. In 1960 the Board of Trade decided to make these figures more widely available and now produce much of this information in the Business Monitor Series. Unfortunately, they have not been able to publish all the information they collect, largely because of the Statistics of Trade Act. Not only are they obliged to protect the individual manufacturer but in several instances, even when the figures have been suppled by the Trade Associations, it happens that where there are two branches of the trade (in the leather industry, for example) one is not prepared to let the other know its stock position.

Several Trade Associations do in fact collect and publish (either to members or in some cases freely) various production statistics. In addition to the statistics collected by the nationalized industries, covering coal, gas, electricity, etc., many private and semi-official bodies collect statistics relating to their own industry. A great deal of statistical information is available from the Iron and Steel Federation, the British Bureau of Non-Ferrous Metals collects information regularly about the industry and a useful summary of these figures is published every month in *Metal Age*. Lloyd's Register of Shipping collects detailed material about shipbuilding both in this country and overseas. The Society of Motor Manufacturers and Traders issues a monthly bulletin giving figures of production of all types of motor vehicles. New registrations are also collected by the Ministry of Transport and it is possible to obtain from them advance figures on special payment. The Cotton Board collects detailed information about the cotton industry which appears in the *Cotton Board Statistical Bulletin*. The Wool Industry Bureau of Statistics also collects similar information on the wool industry. This is published each month in the *Monthly Bulletin of Statistics*.

So far I have outlined the general availability of industry statistics from official and non-official trade sources and have pointed out that there are still comparatively few Trade Associations which collect data from their members. Quite often you will find that in certain industries no statistical data for the industry as a whole are available, although they would obviously be of use to a company which is part of such an industry. The usual reason given is that, unlike the United States, where there is a greater appreciation of the use of statistics, in this country manufacturers are unwilling to disclose information in case it will be of use to their competitors. This reluctance in practice is very rarely justified, but nevertheless the reluctance remains. Can anything be done to fill in the gaps? I have one suggestion which a company may be able to adopt.

Recently, largely as a result of a lecture which I had given to executives from industry, at the Department of Production Engineering at the University of Birmingham, I was approached by a senior executive of a leading aircraft manufacturing company on this problem. Up to now most of their business had been large-scale contracts with UK and foreign Government Departments, but the company realized that, with the contraction in the aircraft industry, they would have to diversify. They also realized that one of the machines they had developed for testing the fatigue of metals could be adapted to other uses. They had tried unsuccessfully to get the necessary statistical data and, although they knew what companies made a particular machine in which that component could be used in an improved version, they were unable to obtain production statistics for the specific piece of machinery, which I believe was some form of vibrator, because in the official statistics it was lumped together with many other types.

We have similar problems, where the official statistics are in sufficient detail and where manufacturers are unwilling to disclose their individual figures to us. To get over our difficulties we have drawn up a fairly detailed questionnaire which is distributed for us to the manufacturers concerned by an independent, nationally known, firm of chartered accountants. The completed questionnaires are then returned to the chartered accountants, who aggregate the figures, letting us have the total figures. We estimate that our survey covers about 80 per cent of the industry as a whole. We then analyse the statistics and write a report on the state of the industry, which we make available, free of charge, to the participating companies. Such a scheme could be given a wider application, and is one way where a company can by its own efforts supplement the statistics available.

To proceed next to my third group of data, data on competition, I think that it is obvious that the activities of competitors both at home and abroad have a direct bearing on the framing of the company's commercial policy. It is extraordinary that in this country there is no complete list of companies and what they make. I am told by a senior statistician of the Board of Trade that the publication of such a list would constitute an infringement against the Statistics of Trade Act. In fact, when the Board of Trade took the first Census of Distribution in 1950 its librarian had to buy £1,500 worth of large-scale ordinance survey maps and people were detailed off to work a specified area, counting the number of shops and type of business!

In spite of this there are of course several directories which give company information. Two worth noting as far as the UK is concerned are the Dun & Bradstreet *Guide to key British enterprises*, and *Who owns whom*, by Roskill. The latter also publish a continental edition. When detailed information is required there are several directories similar to our own *Stock Exchange Year-book.* I would recommend to you a book by George Henderson, formerly of Guildhall Library—*Guide to company information.* This lists the main company directories for each country and it also contains a translated glossary of the financial and accounting terms which appear in the company accounts. This is also very useful when using original company accounts.

In addition to published collected sources it is wise to try to build up the company accounts of competitors and customers both in this country and abroad. Quite often useful information appears in the Report of the Directors. Another source for competitors' activities is their technical literature. This is often readily available.

In addition it is necessary to keep a track of competitors' developments. For this purpose the technical Press and the *Financial Times* can be useful and it is worth having some form of press cuttings, which can be filed with the rest of the company information. Quite often one finds that the company about which information is required is a private company. There are of course credit rating organizations, such as Dun & Bradstreet and the Manchester Society for the Protection of Trade. As far as overseas companies are concerned we have found that the overseas intelligence departments of the major banks are the most useful—they all have either overseas branches (as in the case of Barclays) or agreements with banks in the countries concerned. Another source is the Board of Trade Export Services Branch. This is able to issue status reports on certain companies, but they are usually confined to those companies with which a UK company has had dealings. The branch will, however, try to obtain additional information through its overseas commercial officers.

Besides the basic information about the company, it is necessary to follow new developments by competitors. Here the technical trade Press can be useful. Additionally, use can be made of several Comtel Reuter services—which, at a price, cover various industries on a worldwide basis. It is possible to subscribe to services relating to specific industries and we take the chemical and textile industry sections.

Since the formation of the Common Market there have been a wide range of agreements and mergers between various companies in different countries of the EEC, and between firms in the EEC and American or British companies. It is obviously important for a company's information service to be aware of these. There are several sources in addition to the special services. Reuters produce *Common Market News*, which is published weekly, and which from time to time devotes a section to these matters. Also useful, but expensive, is a press agency publication which originates in Luxembourg called *Europe—Daily Bulletin*. Both these publications are probably the best source for following the activities of the EEC.

Another publication worth mentioning is *Opera Mundi Europe*. The original is published in Paris, but from 1964 an English version has been published and distributed by the Times Publishing Company.

I do not propose to say very much about the official publications of the EEC, since these were described in my earlier paper (*Aslib Proceedings*, June 1962).

The final group of data which an economic information unit should hold is the company's own publications. Memoranda which are prepared by departments for the Board are deposited in the library, as are departmental progress reports. These are useful to the economic information service, because they give an indication of the lines of development being followed by each of the departments. Although these are no substitute for personal contact, they enable the unit to keep a special watch for information in new fields of interest. It is also useful for the person in charge of the company's information service to attend departmental meetings. In my case I attend those of the Market Analyses Unit.

In our economics library alone we take about 1,800 titles. These consist first of the official statistics of the countries in which we are interested because we export to them or because they have competitor companies. Normally we collect the general statistics (equivalent to the *Monthly Digest* or *Annual Abstract*), trade statistics, production statistics (both official and where possible those of the various trade associations in the textile fields), and miscellaneous material such as bank reviews and reports by the Economist Intelligence Unit and other organizations. For the countries most important to us (the UK, United States, Japan and Australia) we go into considerably greater detail. We also take major publications of the international organizations, including their statistical series.

The next main section of the library consists largely of trade periodicals, covering the textile industries and end-user industries, for example the carpet trade, fishing industry and tyre manufacture, together with a wide range of fashion magazines such as *Vogue* and *Harper's Bazaar*.

We also hold a certain number of statistical and economic journals, and a wide range of economic and textile newspapers for this and major overseas countries.

Each of these newspapers and periodicals, excluding the purely statistical series, is read by the information staff. Three of the staff are graded translator/information assistant, and they read the foreign language material. Items of interest are circulated in a daily or nearly daily *Information Note* (Europe) and other short items are circulated throughout the company in our *British and Foreign News Review* (which is issued daily from the Pontypool library). Details of major articles are circulated weekly in an Information Bulletin, and these are indexed by subject matter, using our own classification scheme, which is used for all material in the library.

Where material is of interest only to selected people, then it is not circulated throughout the company but is brought to the attention of the individuals concerned. At the moment a considerable number of periodicals are bound; others are kept for two years. Eventually it seems that we will have to introduce some form of microfilming and we are at the moment looking into this problem.

The policy which we have adopted as far as foreign material is concerned is that we should have the same sort of material, the same sources, as the French, German, Italian, etc., business man has himself. Thus, where we are preparing material for use, say, by the Board of Trade in international negotiations, the results of which are likely to affect the company, we are able to judge current European thought on trade problems. We also want to be able to see not only what our competitors are doing but also the way they are thinking. For this reason I have made a number of visits abroad.

In the time available I have tried to illustrate the service an economic information unit should offer; I have tried to give you in broad terms an idea of the information such a unit should collect, and have emphasized that not only should it be collected but it should also be brought to people's attention. In other words, our function is not only to answer specific inquiries—although this is part of our job—but also, and this is probably more important, to keep people informed of events which have a bearing on the company's policy and interests. No one person can be an expert in all fields, and no one information unit can have all the answers at hand. The important point is knowing where to go, and for this reason I feel that personal contact with people doing similar jobs in other fields is vital. I believe that except in those rare cases where the disclosure of information is against the company's interest there should be a much freer exchange of information between firms and organizations.

We have, as I have tried to show, a fairly comprehensive economic information unit. I appreciate that in many instances a unit as big as ours is not possible, but hope that I have been able to give some idea of the lines along which such a unit should be developed, and some idea of the type of service an economic information unit can provide.

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RUSSIAN Translator/Information Officer. The Research and Development Department of Reed Development Services Ltd is based at Aylesford near Maidstone. We wish to appoint a man or woman assistant information officer who will act as technical translator in Russian. The duties involve translating (we handle a wide range of languages and subjects), scanning and abstracting plus some information work. The range of work should be stimulating and broadening. Applicants should be under 30 with some previous technical translating/information/library experience. In addition to Russian, applicants should have at least one other language, preferably German. Please write for application form, quoting PR.3, to: R. C. Miles, Reed Paper Group Ltd, Group Office Building, Larkfield, near Maidstone, Kent.

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The full text of the Aslib 38th Annual Conference papers read at the University of Exeter, Autumn 1964. The summaries of discussions at sessions are also included.

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Volume 17 **August 1965** **Number 8**

ASLIB CALENDAR 1965

September	
THUR.2.	Visit to Port of London Authority. See paragraph below.
TUE.21.	Midlands Branch meeting, Leeds. See paragraph below.
WED.29 – FRI.1.	39th Annual Conference at University of Keele. See paragraph below.
October	
MON.11.	Film Librarians' Group. First meeting of 1965–66 session. See paragraph below.
TUE.12 – FRI.15.	Course on film librarianship. See paragraph below.
WED.13 – WED. 8 DECEMBER	Course on handling Soviet and East European materials. Wednesday evenings. See paragraph below.
THUR.21.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Advanced thinking by a technical publisher', by T. H. Clare. Details later.
WED.27.	Midlands Branch meeting, Aberystwyth. See paragraph below.
November	
WED.10.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Communication as a management technique', by J. H. Mackay Whitton (Tack Organization, Ltd.)
FRI.12 – SAT.13.	Scottish Branch training course. See paragraph below.
December	
TUE.14.	Midlands Branch meeting. See paragraph below.
WED.22.	Christmas cocktail party at Aslib.
	1966
February	
WED.16.	Midlands Branch meeting, Coventry. See paragraph below.
March	
FRI.18.	Scottish Branch annual general meeting, East Kilbride. See paragraph below.
TUES. 22.	Midlands Branch annual general meeting. See paragraph below.
September	
SUN.25 – WED.28	40th Annual Conference at Scheveningen (Netherlands). See paragraph below.

1965 Annual Conference: important notice

At the closing date for applications for this year's conference (31st July) nearly all accommodation was taken, so a further tentative 'allocation' has been reserved to meet the expected late applications. It would be much appreciated if all applications could be sent in now, whilst we still have room. All unbooked accommodation will be *released* on 31st August!

1966 Annual Conference

Members' attention is drawn to a notice inserted in this issue of *Aslib Proceedings* announcing arrangements for the 40th Annual Conference which is to be held at Scheveningen, The Netherlands, from Sunday 25th to Wednesday 28th September 1966.

FID 32nd Conference

The 32nd Conference of the International Federation for Documentation will be held at Scheveningen, The Hague, from 19th–24th September 1966. A notice with further details is inserted in this issue of *Aslib Proceedings*. Aslib members are invited to attend.

IFLA General Council

The International Federation of Library Associations will meet in The Hague from 11th to 16th September 1966.

Course on Handling Soviet and East European Materials

The course on handling Soviet and East European materials will be held at Aslib again after an interval of two years. This course is intended for librarians and information workers with no knowledge of Russian who need to handle publications from the Soviet Union and other East European countries in the course of their work. It will enable students to become familiar with the Cyrillic alphabet, to transliterate, to recognize the more common Russian bibliographic terms and scientific words, and to identify other East European languages. The course also covers the organization of publishing and bibliography in the Soviet Union, and sources of supply of Russian materials in Great Britain. A visit to the Patent Office Library to study the treatment of such materials in a large library is included. The lecturer will again be Mrs Judith Collins, who was formerly in charge of the Commonwealth Index of Translations and the Register of Specialist Translators in the Aslib Information Department. The lectures will be held from 6.30 to 8 p.m. on Wednesday evenings from 13th October to 8th December. The fee for the course will be eight guineas. A programme is enclosed in this issue, and applications should be made on the form contained in it.

Course on Film Librarianship

Two years ago, with the co-operation of the Film Libraries Group, Aslib held a course on film librarianship. The course was felt to be a great success by those who attended it, and, owing to its pioneering nature, attracted considerable attention from library organizations in other countries. Since then there has been a steady growth in the size and numbers of film libraries, and of film collections in other libraries, and there is evidence of a considerable demand for this type of training. It has therefore been decided to put on a revised version of the course. This will be held from 12th to 15th October, based on Aslib Headquarters. It will consist of lectures on all aspects of film library work and visits to a wide variety of film libraries. A new feature will be the inclusion of lecture-demonstrations in some of the libraries visited, which will enable more practical instruction to be given on some technical subjects. In addition students are invited to attend a special meeting and reception which is being held of the Film Libraries Group in connection with the course, on the evening of 11th October, at which Sir Arthur Elton and Mr. Ernest Lindgren will be the speakers. The fee for the course will be ten guineas. A full programme is enclosed in this issue, and applications should be made to the Education Officer, Aslib, on the form contained in it. As the number of places on the course is strictly limited, intending students are advised to book early; provisional bookings by telephone or telex will be accepted.

Visit to the Port of London

The popularity of the trip around the Port of London on 20th July was such that alternative arrangements have now been made to accommodate the many for whom there was not room on that occasion, and others who may wish to avail themselves of this second opportunity, on 2nd September; embarkation at 2 p.m. at Tower Pier and return about 6.15 p.m. Tickets will be 10*s* 6*d.* Further particulars on application to the Meetings Organizer, Aslib.

Programme for future Aslib Meetings and Conferences

From time to time in the past members have made suggestions for subjects which they would like to see included in the programme of Aslib meetings and conference. This kind of co-operation is very helpful and it is much hoped that in the future still more members will come forward with requests for specific subjects for programmes. These are welcome at any time, but most of all in the early autumn, when the committees are beginning their work for the new season.

Suggestions should be made in writing and addressed to Aslib for the attention of the Meetings Organizer.

Midlands Branch

The following meetings have been arranged by the Midlands Branch:

Tuesday, 21st September 1965, at 6.30 p.m.: 'Conception and compilation of a text-book', D. Davinson, School of Librarianship, Leeds.

Wednesday, 27th October 1965, at 6.30 p.m.: 'Applications of O. and M. in libraries', F. N. Hogg, Principal, College of Librarianship, Aberystwyth.

Tuesday, 14th December 1965, at 6.30 p.m.: Brains Trust. D. Whale (TI), J. Lowndes (GKN), T. W. Chandler (GEC) and A. Wilson (Dudley Central Library).

Wednesday, 16th February 1966: One-day meeting on 'Should an abstract be informative or indicative.' D. E. Bagley (English Electric Co. Ltd); B. C. Burrows (Associated Engineering Ltd). Afternoon visit to Courtaulds Ltd, Coventry.

Tuesday, 22nd March 1966: Annual General Meeting at 6.30 p.m. After the formal business Mr W. Ashworth (ICI Fibres Ltd) will discuss inter-relations between disciplines and the difficulties in information retrieval, and also some benefits in information retrieval that have resulted from the adoption of techniques from other fields of interest.

Scottish Branch

A training course will be held at Bridge of Allan in the Allan Water Hotel on Friday and Saturday, 12th and 13th November 1965. The theme of the Course may be summed up as 'Help from your neighbour' and it is hoped to have six invited contributions during the two days. Further particulars will be notified as soon as details have been confirmed.

The one-day annual general meeting and conference will be held at the National Engineering Laboratory, East Kilbride, near Glasgow, on Friday, 18th March 1966. Precise details of the programme will be made known early in the New Year.

Dewey Decimal Classification

Mr Benjamin Custer, editor of the Dewey Decimal Classification, will speak on the 17th edition of Dewey at the Library Association, Chaucer House, Malet Place, WC1, on Wednesday 15th September at 6.30 p.m. The meeting is being arranged by the London Home Counties Branch and the Cataloguing and Indexing Group of the Library Association.

The Management of Scientific Information

On 21st June 1965, Mr Walter M. Carlson, Director of Technical Information at the U.S. Defense Documentation Center (DDC) in Washington, addressed a joint meeting of members of Aslib and the Institute of Information Scientists about the work of the Center. Despite rather short notice the meeting attracted an audience of between sixty and seventy and, under the expert chairmanship of Mr A. H. Holloway, Head of the Naval Scientific and Technical Information Centre, at the Ministry of Defence, the talk was followed by an interesting discussion.

The proceedings of the meeting will not be published by Aslib since the paper was part of material already (or to be) published in Washington.

Trade Associations and Professional Bodies of the United Kingdom

Mrs Patricia Millard has informed us of a free amendment service to the second edition of her reference book *Trade Associations and Professional Bodies of the United Kingdom.* This is published every six months, commencing March 1965, and is designed to keep the book up-to-date by giving information on changes which have occurred since its publication last September. It will also note any forthcoming address or title changes as well as future amalgamations. This service will continue until publication of the third edition in 1966. Amendments will be sent automatically to all purchasers of the book who have ordered direct from its publisher. Further copies of the list will be sent free on request to David Fanning Associates Ltd., 158 High Road, London, N22.

Dedication of the New Chemical Abstracts Service Building

A well-planned programme of seminars and a symposium on information handling was organized for visitors to the dedication of the new CAS building on the 2nd to 4th June at Columbus, Ohio.

The seminars on the services provided by CAS were conducted by senior staff. The Research and Development Department houses the most highly organized team of information scientists in the world. The Division is computer-orientated, and the facilities include IBM 1401 and IBM 1410 computers. In addition CAS leases computers when necessary from Ohio State University. *Chemical Titles* and *Chemical-Biological Activities* were both conceived and developed in the department and are now well established. A new service makes available copies of the tapes used to print *Chemical Titles* so that subscribers can produce author and subject bibliographies to their own requirements.

The eminent speakers at the symposium included Sir Harry Melville, Chairman, U.K. Science Research Council, who represented overseas scientists.

The Governor of Ohio gave the dedication address and referred to the worldwide recognition of CA as pioneering in the field of scientific documentation.

The visitors to Columbus were invited to a reception and banquet in the evening. The guest of honour was President Johnson's Special Assistant on Science and Technology, Dr Donald F. Hornig. A tremendous ovation greeted Dr Hornig's announcement that a contract had just been signed making $2 million available from Federal sources for CAS to make a computer-based inventory of all chemical compounds.

Miss Barbara Kyle

Members will be sorry to learn that, because of ill-health, Miss Barbara Kyle has felt obliged to give up full-time work for Aslib as Research Librarian and Managing Editor of the *Journal of Documentation.*

As a member of the Editorial Board of the *Journal of Documentation* she will continue to give us the benefit of her knowledge and experience, and will also undertake advisory and literary work appropriate to her specialized interests.

Miss Kyle joined the staff of Aslib in June 1962 as Research Librarian, but has played a continuously active part in its work for over twenty years, being both Honorary Secretary and Chairman of Council as well as a member, in turn, of nearly all the standing committees.

We wish her a speedy return to full health and vigour.

STANDING COMMITTEES 1965–66

The following Standing Committees were appointed by Council at its meeting on 30th June 1965:

EDUCATION COMMITTEE

F. Liebesny, *Chairman* (British Aluminium Company Ltd)
L. G. Patrick, *Deputy Chairman* (Aluminium Laboratories Ltd)
A. C. Bubb (Royal College of Advanced Technology, Salford)
P. E. Colinese (Central Electricity Generating Board)
H. H. Goom (G.K.N. Group Research Laboratory)
W. R. Moss (Shell Chemical Company Ltd)
F. Newby (Hardman & Holden Ltd)
D. T. Richnell (University of Reading)
W. L. Saunders (University of Sheffield)
P. H. Sewell (Individual Member)
G. Woledge (British Library of Economic and Political Science)
A Library Association Observer
An A.B.L.S. Observer

INTERNATIONAL RELATIONS COMMITTEE

Sir Frank Francis, *Chairman* (Director and Principal Librarian, British Museum)
Mrs J. Lancaster-Jones, *Deputy Chairman* (British Council)
B. Agard Evans (Individual Member)
D. J. Foskett (University of London Institute of Education)
Miss M. Gosset (Individual Member)
F. R. Taylor (Manchester Public Libraries)
G. H. Wright (Hatfield College of Technology)
R. C. Wright (Individual Member)
D. Newcombe (B.S.I. Nominee)
Dr P. Young (B.S.I. Nominee)
An OSTI Observer
A Library Association Observer

MEETINGS COMMITTEE

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Dr M. F. C. Paige, *Deputy Chairman* (ICI Ltd, Nobel Division)
A. C. W. Ashton (Shell International Petroleum Company Ltd)
P. D. Friend (UKAEA Atomic Weapons Research Establishment, Aldermaston)
W. R. Moss (Shell Chemical Company Ltd)
J. R. Sharp (ICI Fibres Ltd)
Miss M. F. Webb (Head of the Library, Patent Office)
A Representative of the Northern Branch
A Representative of the Scottish Branch
A Representative of the Midlands Branch

PUBLICATIONS COMMITTEE

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W. Ashworth, *Deputy Chairman* (ICI Fibres Ltd)
L. J. Anthony (UKAEA Research Group, Culham)
R. L. W. Collison (British Broadcasting Corporation)
G. P. Henderson (Individual Member)
C. E. C. Hewetson (H. J. Heinz Co. Ltd)
A. Nicholls (University of Birmingham)
G. M. Paterson (Imperial College of Science and Technology)
W. H. Rutherford (Individual Member)
F. R. Taylor (Manchester Public Libraries)
K. D. C. Vernon (The Royal Institution)
R. A. Watson (John Wiley & Sons Ltd)
Mrs A. M. Whitrow (Individual Member)
G. Woledge (British Library of Economic and Political Science)
A Library Association Observer

RESEARCH COMMITTEE

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L. J. Anthony (UKAEA Research Group, Culham)
D. V. Arnold (ICI Ltd, Heavy Organic Chemicals Division)
Professor J. D. Bernal (University of London)
J. E. L. Farradane (Northampton College of Advanced Technology)
R. M. Fishenden (UKAEA Research Group, Harwell)
A. G. Mackenzie (University of Lancaster)
D. T. Richnell (University of Reading)
Dr M. A. T. Rogers (ICI Ltd)
W. L. Saunders (University of Sheffield)
Dr D. J. Urquhart (National Lending Library for Science and Technology)
Miss M. F. Webb (Head of the Library, Patent Office)
An OSTI Observer
A Library Association Observer

EXECUTIVE AND FINANCE COMMITTEE

D. V. Arnold, *Chairman* (ICI Ltd, Heavy Organic Chemicals Division)
L. J. Anthony, *Deputy Chairman* (UKAEA Research Group, Culham)
A. H. Holloway, *Honorary Treasurer* (Individual Member)
J. R. Stocks, *Honorary Secretary* (Shell International Petroleum Co. Ltd)
The Chairmen of the five Standing Committees, or, in their absence, their Deputies
L. G. Patrick (Aluminium Laboratories Ltd)
D. T. Richnell (University of Reading)

NON-STANDARD MATERIAL AT THE NLL

K. P. BARR

Department of Education and Science, National Lending Library for Science and Technology

Aeronautical Group and Technical Translation Group Joint Conference, Cranfield, 1st–3rd April 1965

I HAVE been asked in this lecture to tell you something of the way in which the National Lending Library treats non-standard material, particularly pre-prints, conference proceedings and reports, and shall deal with these three categories of material in order.

Pre-prints

We have no special method of dealing with this type of material. We handle pre-prints either as serials or as books. Where the pre-prints have numbers, and where we can place a standing order or a subscription, we shelve them among our periodicals, which are shelved alphabetically by title. If we cannot handle pre-prints in this way, we treat them as books. Pre-prints of this type are often those of a conference. Where a number of pre-prints refer to one particular conference we keep them together and shelve them in the book store as for conference proceedings. I should like to point out that the kind of material to which I have been referring does not always have the title 'pre-prints'; the items may be called 'papers', 'conference papers' or even 'reports'. For example, pre-prints put out by the American Society for Testing Materials are called pre-prints and we would hold them under that name, whereas those of the American Society of Mechanical Engineers are held as 'Papers—ASME'. The Society of Automotive Engineers produces two different series, one entitled 'papers' and the other 'pre-prints'. I have had some correspondence with the Secretary of the Aslib Aeronautical Group regarding pre-prints in which the Group is particularly interested, and I can assure you that all these are now either currently received at the NLL or on order.

Conference proceedings

The published proceedings of conferences, we realized quite soon in the history of the NLL, were in heavy demand by borrowers and were, in many cases, difficult to discover and obtain by normal selection methods. We consequently use a special selection method for conference proceedings. We take the publication *World List of Future International Meetings* published by the Library of Congress, and select all conferences which are in the NLL subject field. We send letters to the organizing bodies of these conferences asking them to let us know whether any proceedings are going to be issued, and if so what is the best way to obtain them. We have now sent over four thousand of these letters. As a result of these letters we obtain useful information. We may be told that no proceedings are to be published and in these cases we might get abstracts or pre-prints. We may be told that the proceedings of the conference will be published in a journal or in a commercially published book and in these cases we know that we will obtain the conference proceedings by our normal selection methods. We may be told that the proceedings are going to be published by the organizing body and that they will send us a copy when they are available. We can also receive other useful information such as that the conference has been cancelled or postponed.

A recent survey of failures to supply conference proceedings showed that most of these unsatisfied requests were for the proceedings of conferences of American institutions. To improve our holdings of this type of material, we have just started to select, in a similar way, from the publication *Scientific Meetings* published by the Special Libraries Association. We propose to use this to select the proceedings of conferences held in the United States but will continue to select all other conferences from *World List of Future International Meetings*.

Our method of handling these proceedings when they arrive at the NLL is, as in the case of pre-prints, to treat them as serials where this is possible. This can be done with the proceedings of annual meetings and continuing series of international conferences. We also try to order proceedings as serials whenever possible, but this can only be done in few cases. Many of the international conferences, although published regularly, are held in different countries each year and published in the country where they are held. However, most of the conference proceedings will be shelved as books. Now, in the NLL our books are shelved alphabetically by title and this has caused certain difficulties as regards the location of conference proceedings. We originally shelved by the actual title and found we had many shelves all starting with 'proceedings . . .'. We also found, as I expect you have, that borrowers ask for conference proceedings in many different ways. For example, take the proceedings of the First International Congress of the International Federation of Automatic Control, held in Moscow in 1960 and published in 1961. These proceedings, when we received them, consisted of four volumes entitled *Automatic and Remote Control* and under our shelving system they were placed on the shelf under 'Automatic . . .'. We found that borrowers asked for them as *Proceedings of the Moscow Congress on Automatic Control*, *Proceedings of the IFAC Congress*, *The 1960 IFAC Proceedings*, *The IFAC Congress in Moscow*, and many other combinations. Until our stores staff realized the possible titles that apply to the title *Automatic and Remote Control* we may have returned loan forms saying that we did not hold this work, when in fact we did. An additional complication in this case was that people sometimes quoted the correct book title, *Automatic and Remote Control,* and the volume number, and then gave authors' names which could be Russian. This could cause confusion with the cover-to-cover translation, *Automation and Remote Control.*

Because of this problem of identifying conferences when requested, and also because of the problem of locating conference proceedings which are printed in serial publications, we decided to compile a conference index. This index is in no sense a catalogue but is a keyword index, and a file card is made out for each significant word which occurs in the title of the conference. Each card refers to the particular keyword under which the proceedings are shelved in the book store, or to the shelf mark in the case of proceedings published in a periodical. We are then able to have loan requests for conference proceedings checked against this index and a location found. We propose to publish the conference index, and to enable us to do this we have put the information contained in it on to punched cards. The first issue was published at the beginning of May and contains details of the conference proceedings which were received during 1964. There are about a thousand of these and they were held any time from 1960 onwards, since conference proceedings are often published a long time after the conference was held. We are producing this index experimentally; we do not know if anybody will find it useful, but we think they might. It is free and has been sent to a number of selected borrowers and will, of course, be announced in the library journals. If it seems that it will be useful, we are considering publishing it quarterly with the possibility of the fourth issue being an annual cumulation. The index consists of a list of the conferences giving their full title and the place at which they were held, and each entry is given a number. There is a key word index which refers to the numbers of relevant conferences and which can be used to find what conferences were held on particular subjects.

Reports

In the case of report literature we again shelve as a serial whenever possible. Where the title contains the word 'report', 'technical report', 'memorandum', etc., they are shelved under this title in the serial run. This applies to the series of reports from the United Kingdom Atomic Energy Authority and similar organizations.

The main groups of report literature which are treated separately are those coming from the United States. These are, firstly, the AD and PB reports which were issued by the Office of Technical Services, and now by the Clearinghouse for Federal Scientific and Technical Information. We have a standing order for all these reports. The next group are the Atomic Energy Commission reports which are now issued by CFSTI. We are a depository library for these reports. The third group are the reports issued by NASA and again we have a standing order for all the reports. The fourth type, which are rather different, are the Rand reports. These reports are issued by the Rand Corporation in Santa Monica, California, and cover a variety of subject fields including some in the social sciences which would normally be considered outside our field. However, when we applied to the Rand Corporation for the scientific reports we were made a depository, and we now receive all their reports.

I will deal with the other three groups of American reports separately. Firstly the AD and PB reports. These are reports of work carried out by numerous organizations in America under government contracts. Up to June 1964 we received all these reports on microfilm, but since then they have been issued on microfiche. We are now receiving these microfiche by air mail from the United States and the supply is up to date. This is a change from the previous position, since when we were receiving microfilm there was as much as three months' delay between the reports being announced in the bibliography, USGRR—United States Government Research Reports—and our receiving them at the NLL. At the present time when we receive a bibliography we have already received microfiche copies of the reports which are listed in it.

The Atomic Energy Commission reports up to July 1964 were issued in hard copy form which we shelved in code letter and number order. After this date the hard copies ceased to be issued and all the material was received on microfiche. We have a good coverage of recent reports, but our earlier stock is incomplete as most of it has been received as donations.

In the case of the NASA reports, these were originally issued as hard copies in several series, technical reports, technical memoranda, etc. These series were treated as normal periodicals and shelved under title. From July 1964 again, these reports have been issued on microfiche. We do not get all the NASA reports as there is still some difficulty in getting a complete supply from America, but where reports are asked for and we do not have them in our collection we can order them specially from America or, in some cases, obtain them from TIL.

To identify these reports when they are requested we use the published guides. For the AD and PB reports we use the fortnightly publication *United States Government Research Reports,* which, from the beginning of 1965, has been retitled *United States Government Research and Development Reports* and now has improved indexes. These include corporate author, personal author, subject, contract and AD number indexes.

Our guide to the Atomic Energy Reports is *Nuclear Science Abstracts,* together with certain reference works. The cumulative report number index of *Nuclear Science Abstracts* is a very useful tool and we also use a dictionary of report series codes, published by the Special Libraries Association in 1962. Most of you here will appreciate that reports tend to receive more than one number in the course of their travels from their place of origin through the various issuing channels. I have here an example of a report which we were asked for, and which in the course of its life had received several different numbers. We were asked for it initially under a NASA-CR number; we then discovered that NASA had given it an N 64 number; from this we got to an NSG number and then to an SAO SR number. This last number told us that it was a publication of the Smithsonian Astrophysical Observatory and we then found that it was, in fact, special report number 130 of the Smithsonian Astrophysical Institute Observatory. Under this title it was shelved among our periodicals.

As a guide to the NASA reports we use *STAR*—'Scientific and Technical Aerospace Reports' which is published fortnightly.

I would like to mention a new guide to these United States reports which has been announced but of which we have not yet seen a copy. This is to be called *Government-Wide Index to Federal Research and Development Reports,* and is to be published monthly by CFSTI. It is to consist of information on the reports announced in the other United States government publications during the previous month. Since it is reported to cover *Nuclear Science Abstracts, STAR*, and *USGRR*, it would appear that it is going to be a very large publication. The first issue is reported to be published at the end of May, and is being prepared by means of the computer facilities of the Aerospace Research Applications Center at the University of Indiana.

I would now like to explain how we deal physically with the report material. Up to June 1964 there was no real problem, the NASA and AEC reports were received as hard copies and were immediately loanable and the reports from OTS were received on microfilm from which hard copies could be prepared using our Rank Xerox Copyflo machine. Then, towards the end of 1963, AEC produced some reports on 5 by 3 microfiche and at about the same time NASA produced some reports on 8 by 5 microfiche. Finally in July 1964 the AD's and PB's from CFSTI were produced on 6 by 4 microfiche only and the AEC and NASA reports similarly became available only on this size of microfiche. All the major producers of microfiche have now agreed to accept the ISO specification for 6 by 4 microfiche and to standardize on this size. Now microfiche are very useful for people who want to keep them as records; they can be kept in standard size filing drawers and handled like file cards, but they are not so suitable for lending. We have a microfiche Reader Printer, but this requires manual positioning of the fiche and uses photographic paper which makes it very much more expensive than the Copyflo process we use for microfilm since this, of course, uses cheap paper. What we have done is to tell borrowers that when they request the loan of a report which we hold on microfiche, we will send them, for retention, a duplicate microfiche. We have a Diazo Copier on which we can produce microfiche copies relatively cheaply. The cost is approximately 4½*d* per microfiche (of up to seventy pages), against a cost of 1*s* per page for hard copies produced on the Reader Printer. Now you may think that this in a way is passing the buck to the borrower in that he has to make arrangements to read and print when necessary, but we think it is justifiable for two reasons. In the first place most of the borrowers who ask for material held on microfiche borrow a large amount of this material, but the average borrower does not require microfiche at all. In other words, if anyone uses microfiche they tend to use a lot and consequently they will presumably have equipment for reading then in their own organizations. Secondly, scientific information in the report literature is more diffuse than in journal articles as reports are not refereed; they are progress reports, interim reports and so on. We find that in a report which may have a large number of pages only one or two of these pages are in fact wanted for retention by the borrower. In this case it is more convenient for the borrowing organization to have a retention microfiche and to copy the one or two pages required on a Reader Printer or even by normal photographic methods using an enlarger.

We are interested in future developments in handling microfiche and if suitable equipment becomes available we might revert to sending hard copies to our borrowers. We are looking into the possibility of getting hard copies from CFSTI where they are produced relatively cheaply, but we feel that as reports in this form are very much more bulky the postage costs and time of transport may make this method uneconomical. What we would really like is some form of step and repeat printer which can be loaded with a number of microfiche which would be printed automatically. We know that at CFSTI they have such an enlarger which is capable of producing 25,000 pages of copy in an eight-hour day. We have heard that Xerox are producing an automatic microfiche head for the 914 copier and that Ozalid are developing an automatic fiche enlarger. There is also currently available the Dagmar Twin-Combi which has a manual microfiche shifting arrangement and is reputed to be as quick as the CFSTI automatic enlarger.

Translations

In conclusion I would like to mention our holdings of translations. These are translations from Russian only. Translations in our RTS series are those which we have had made as a result of requests. When we are asked to have translations made we send the work to a specialist translator and when the translation is completed we let the requester have a free copy on condition that he edits it. This is reasonable, since the requester is presumably a specialist in the field or he would not want the article. We then announce the translation in our Translation Bulletin and it is available for sale to anyone who requires it. We have another series of translations, our M series, which are translations donated to us by the many organizations in this country, government departments, research institutes, industrial firms, etc., who make translations for their own use. These are also announced in our Translations Bulletin. The third main group of translations we hold are those announced in the periodical *Technical Translations*, which covers the collection of foreign translations in the Special Libraries Association Translation Centre in the John Crerar Library in Chicago. These are issued by CFSTI on 6 by 4 microfiche and we have a standing order for all those available. We take all cover-to-cover translations of periodicals, and we have special arrangements to obtain books which are translated from the Russian.

We keep a translations index in which particulars of translations we hold, and locations of other translations that we know of, are filed under the original Russian periodical reference. This index refers almost entirely to translations from Russian into English, although a certain number of translations from other languages and into other languages are included. We co-operate with the Commonwealth Index of Translations at Aslib in finding the existence and location of Russian translations.

OFFICE FOR SCIENTIFIC AND TECHNICAL INFORMATION (OSTI)

Discussion of the paper by

DR H.T.HOOKWAY

Director, OSTI

Evening meeting, London, 16th June 1965

ON 16th June Aslib held an Evening Meeting, attended by an audience of over 300 persons, at the Jarvis Hall of the Royal Institute of British Architects (W1). Mr Leslie Wilson, Director of Aslib, took the chair. At this meeting, Dr H. T. Hookway, Director of the new Office for Scientific and Technical Information of the Department of Education and Science (part successor to the DSIR), defined the work and pattern of the Office. The substance of Dr Hookway's lecture appeared in *Nature* on Saturday 17th July 1965, pp. 234–6. The following is therefore a report of the discussion only, which took place after the lecture.

Mr Simon Francis (Metal Box Co. Ltd) asked if NLL policy on clinical medical literature had changed as a result of MEDLARS' outstanding developments and what plans there were for social science literature at NLL as a result of the Heyworth report.

Dr Hookway replied that the National Lending Library was now acquiring literature on clinical medicine and was co-operating with the Royal Society of Medicine to get coverage of the past literature. The DES was considering the possibility of the extension of the NLL service to cover the social sciences.

Mr M. B. Line (Southampton University Library) said that university libraries would like to help train scientists in the use of scientific literature, but were handicapped by lack of staff (both numbers of staff and sufficiently specialized staff) and by the fact that time was not provided in the curriculum by universities for such training. Did OSTI have any intention of pressing universities to give this training?

Dr Hookway replied that he hoped to persuade vice-chancellors and others concerned to make time and facilities available for this.

Mr H. A. Chesshyre (Hertfordshire Technical Library and Information Service) said he believed that technical information courses formed part of the first degree courses at Lancaster University. Hatfield College of Technology included a Technical Information Course in *all* Dip. Tech. and external degree courses held at the College and other Colleges of Technology within the county. Teaching hours varied between twenty-four and forty hours over one or two academic years.

Mr J. S. Rippon (Metal Box Co. Ltd) asked what OSTI's relations would be with the National Reference Library for Science and Invention and whether OSTI was intending to do anything about the compilation of data on engineering materials and their properties. Perhaps OSTI and Aslib could co-operate in establishing a National Referral Centre, or at least investigating the need for such a centre or centres and perhaps carry out a survey of special collections, information sources and bodies of expertise that existed in unexpected places.

Dr Hookway replied that the National Reference Library was to be a part of the British Museum. The Museum and OSTI both received their funds through the Department of Education and Science. It was hoped that the NLL and the NRL would be developed according to a coherent policy. Sir Frank Francis would serve on the Advisory Committee of OSTI, while he himself would serve on the committee of the National Reference Library.

On the question of data on materials and their properties they were concentrating on critically evaluated fundamental data, and were consulting the Ministry of Technology and other interested bodies on what needed to be done.

Mr J. H. L. Bridgewater (Lockheed Hydraulic Brake Co. Ltd) said that Dr Hookway was addressing a meeting which would probably be self-sufficient to the extent of not needing OSTI for several years. Directors of smaller firms in the provinces, however, were abysmally ignorant of sources of information. If Dr Hookway was to concentrate his staff in London, who would 'beat the drum' to make the smaller firms in the provinces aware of the existence of OSTI.

Dr Hookway replied that they hoped to do this through the Ministry of Technology and its Industrial Liaison Officers.

Mr D. Ball (Reed Paper Group) drew attention to the position of the industrial linguist. Were there any plans for training linguists to be translators and interpreters for industrial firms?

Dr Hookway said this was not a matter of high priority, but he would be willing to discuss it.

Dr W. E. Batten (Imperial Chemical Industries Ltd) said that a lot of information officers were needed, but it was difficult to attract science graduates. Would a first degree in information science be possible?

Dr Hookway said this suggestion was interesting and valuable. He had this problem very much in mind, and was considering the possibility of a chair in information science.

Mr J. E. L. Farradane (Northampton College of Advanced Technology) said that it was inefficient to use two people—a linguist with inadequate technical knowledge and an information officer without knowledge of foreign languages. Surely they should be combined, and the training of information scientists should include a foreign language. The diploma course at Northampton College included a language.

With regard to Dr Batten's remarks, it was doubtful whether a lower level course would produce a sufficiently competent man unless it was envisaged that a second level of information person would be wanted in large numbers. There was evidence that new graduates were taking much greater interest in information science as a career, and universities were getting better informed in telling their new graduates about it.

Mr H. A. Chesshyre asked what OSTI was intending to do about the co-ordination of translation activities in this country. Was it OSTI's intention to set up a National Translation Agency?

Dr Hookway replied that they were developing a policy for translation activities generally.

Mr F. Liebesny (British Aluminium Co. Ltd) deplored the apparent lack of interest of OSTI in the support of foreign languages especially since there had been several reports (such as the two reports by the Federation of British Industries, and one by the Hayter Committee) on the foreign language problem in science, industry and technology. Even the Library Association were now contemplating the inclusion of a foreign language in their new syllabuses. If such a small country as Switzerland could have an École des Interprètes, why could not the United Kingdom?

Mr P. D. Waterhouse (Smith & Nephew Research Ltd) asked if there would be an official medium (such as a bulletin) for keeping those interested informed of the activities of OSTI and of the progress of its various projects.

Dr Hookway said that they were looking into the possibility of producing something like *Science Information Notes*.

Mr C. W. Hanson (Aslib Research Department) asked if there was any organic link to ensure co-operation between OSTI and the Ministry of Technology, and the sections of the Department of Education and Science concerned with public and university libraries.

Dr Hookway replied that there was a committee within the Department of representatives of OSTI, the University Grants Committee and those responsible for the public libraries. Other government departments and also Aslib itself were represented on the Secretary of State's Advisory Committee for Scientific and Technical Information.

Mr P. R. P. Claridge (Warren Spring Laboratory) said that in connection with the information service on ergonomics run by Warren Spring Laboratory there was difficulty in giving inquirers the actual literature. WSL could provide the references but NLL did not cover the whole of this fringe subject. In addition many of the inquirers were small firms who could not use NLL direct. Was OSTI considering the problem of providing these inquirers with the literature they request when their interest had already been aroused by the references sent them?

Dr Hookway said that OSTI was aware of the problem. How soon it could be tackled was a question of priorities.

Mr A. J. Mayne (individual member) asked if OSTI was willing to support not only projects sponsored by universities and other institutions of higher education and by large industrial companies, but also proposals for research and development by small independent organizations.

Dr Hookway replied that, in principle, OSTI was willing to help any organization that appeared likely to make a worthwhile contribution.

Mr P. F. Cole (British Petroleum) asked if OSTI intended to establish some form of continuing contact with equipment manufacturers for the purpose of influencing their thinking and of ensuring that equipment introduced in future would be better suited to users' requirements than some past models had been.

Dr. Hookway said he felt that in this area Aslib was the more suitable organization to approach.

Miss M. Gosset (Atomic Energy Research Establishment, Harwell) said that in her opinion the permanent site of OSTI should be inside the National Reference Library building.

Mr R. Sewell (The United Steel Companies Ltd) asked what help could be expected from OSTI for iron and steel engineering, especially with thesaurus building.

The Director commented that he hoped Mr Sewell would use existing facilities before asking OSTI to provide new ones—e.g. the Aslib Coordinate Indexing Group and the Aslib Engineering Group were obvious starting points.

Mr L. Corbett (Atomic Weapons Research Establishment) asked if Dr Hookway had any views on the need for an information clearing house in this country like the Library of Congress's Referral Centre for Science and Technology.

Dr Hookway said that this was an interesting concept, but the situation in the United States differed both in size and complexity. There might be a case for a series of centres or it might be a task for the National Reference Library. In any case the time was not yet ripe.

The Director pointed out that Aslib's Information Department was already doing this kind of work.

Mr J. S. Rippon said that this was a very important matter. There were many special collections whose existence was not sufficiently known, and a searching survey should be made. Aslib could make a beginning by sending a questionnaire to its members.

At this point the Director said he must close the meeting. The large audience of over three hundred and the bombardment of questions had shown the interest of Aslib members in the work of OSTI. Dr Hookway had honoured them by his clear expression of views and the confident replies and information he had given in reply to questions. The future held the prospect of the greatest goodwill and co-operation.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

Books and Pamphlets

*AMERICAN CHEMICAL SOCIETY
Patents for chemical inventions: symposia sponsored by the Division of Chemical Literature and the Division of Industrial and Engineering Chemistry at the 145th meeting of the American Chemical Society, New York, September 9–13, 1963. Elmer J. Lawson and Edmund H. Godula, Symposia chairmen. Washington, the Society, 1964. viii, 117 p. (Advances in chemistry series, 46.)

AMERICAN GEOGRAPHICAL SOCIETY
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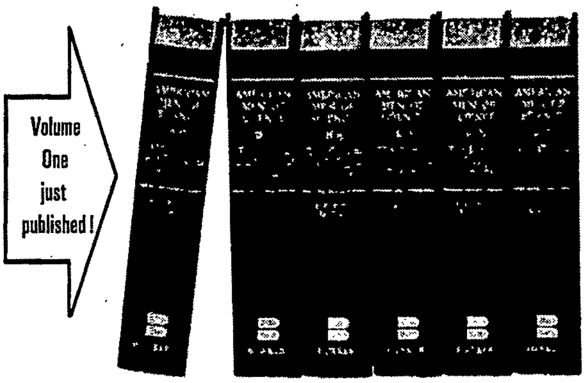

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September	
WED.29 – FRI.1.	39th Annual Conference at University of Keele.
October	
MON.11.	Film Librarians Group. First meeting of 1965–6 session.
TUE.12 – FRI.15.	Course on film librarianship.
WED.13 – WED. 8 DECEMBER	Course on handling Soviet and East European materials. Wednesday evenings.
THUR.21.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Advance thinking by a technical publisher', by T. H. Clare. See paragraph below.
TUE.26 – FRI.29.	Junior introductory course. Aslib. See paragraph below.
November	
WED.10.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Communication as a management technique', by J. H. Mackay Whitton (Tack Organization, Ltd.)
FRI.12 – SAT.13.	Scottish Branch training course.
December	
WED.22.	Christmas cocktail party at Aslib.

1966

February	
WED.16.	Midlands Branch meeting, Coventry.
March	
FRI.18.	Scottish Branch annual general meeting, East Kilbride.
TUE.22.	Midlands Branch annual general meeting, Birmingham.
September	
UN.25 – WED.28.	40th Annual Conference at Scheveningen (Netherlands).

Evening Meeting

At the meeting on Thursday 21st October Mr T. H. Clare, director of Edward Arnold (Publishers) Ltd, will survey present practice and consider future trends in book and periodical publishing. He will examine the 'information explosion' from the viewpoint of a publisher concerned with producing books and journals quickly, cheaply and profitably.

The meeting will be held at 3 Belgrave Square at 5.30 p.m. and tea will be at 5 o'clock.

Aslib Electronics Group

Ashridge College was once again the venue for the Seventh Annual Conference held on 9th to 11th July. Members, including several from the Continent, enjoyed a programme which followed the pattern of previous years—a fairly light talk after dinner on the Friday evening, this year on 'Local History' by Mr P. Waln, County Archivist of Hertfordshire, succeeded by a mixture of 'subject' and 'library information retrieval' papers. The subject papers were delivered by Professor F. G. Smith of the Nuffield Radio Astronomy Laboratory and Mr W. J. Bray, Deputy Director of Research, G.P.O. Engineering Department, speaking on Radio Astronomy and Satellite Communications respectively.

There was much food for thought in Mr S. C. Dunn's highly informative talk, 'Management Attitude to Information', and the other side of the story, 'Problems in Selling Information to Management', was covered by Mr L. Taylor, the Ferranti Group Librarian. The future plans of NERC for selective dissemination of information were described by its Technical Officer, Mr T. M. Aitchison, and one of the highlights of the Conference was the paper surveying developments in information retrieval by Mr J. Becker, who had travelled from the Catholic University of Washington D.C. specially for this. It was generally remarked that the overall standard of papers both in content and presentation had been particularly high.

Junior Introductory Course

A junior introductory course to special library and information work will be held at Aslib from Tuesday 26th to Friday 29th October 1965. It is intended for students who have recently taken up junior posts in special libraries and information departments, and is designed to provide those who are occupied mainly in routine duties with an understanding of their work and its place in the organization which will help them improve their efficiency and give them an incentive to progress to more exacting tasks. The course will include lectures on various aspects of library and information work, visits to other libraries and information departments and a final discussion session which will include ways of following up the course with further study. The fee for the course will be six and a half guineas.

A programme of the course is enclosed in this issue, and applications to attend should be made on it. As these courses are usually heavily over-booked, intending students are advised to book early. Provisional bookings will be accepted by telephone or telex. Students holding a university degree or in a senior position will not be accepted for this course, and are advised to wait for the senior introductory course.

Degrees in Librarianship

Developments at the School of Librarianship and Archives of London University offer new opportunities for advanced study and research.

From the next session, the Postgraduate Diplomas in Librarianship and Archives will be awarded on the present Part I of the course (one year), and the thesis now submitted for Part II will no longer be required. Present standards of admission and examination will be maintained.

Candidates who have obtained one of the Postgraduate Diplomas or an equivalent qualification will be eligible to apply for registration for the following higher degrees in Librarianship or Archives:

M.A. by examination (one year's course)
M.Phil. by thesis (not less than two years)
Ph.D. (not less than two years).

The M.A. in Librarianship is intended for advanced studies in selected subjects and to prepare candidates for research projects. There will be four written examination papers chosen from a syllabus allowing candidates to specialize in (*a*) Historical and analytical bibliography and manuscript studies, (*b*) Communication studies (including information science), (*c*) Comparative studies (including management studies, technology, etc.), or (*d*) Historical and social studies, and regional studies. Details of these courses will be available shortly.

The Special Advisory Board in Librarianship and Archives, which has been in existence now for fifteen years, is replaced by a Board of Studies with responsibility for courses of study and admission of candidates to higher degrees.

Use of Biological Literature

A course on the use of biological literature will be held from Wednesday 10th to Friday 12th November 1965 at the Bradford Institute of Technology, Bradford 7.

Lectures by practising biologists and literature specialists will cover: libraries and biological collections, abstracts and current awareness services, biochemistry, medicine and pharmacy, toxicology, communication problems, taxonomic reference sources, patents, MEDLARS and the NLL, translations, etc. The final day of the course will be spent at the National Lending Library for Science and Technology at nearby Boston Spa.

Since directed library work is an essential feature of the course, the number of places is limited. Further information is available from the course organisers, Dr R. T. Bottle and Dr M. V. Wyatt at the Institute.

Presentation of Technical Information

A course of twelve lectures on the writing of technical and scientific reports will be held at Ealing Technical College on Wednesdays at 6.30–8.30 p.m., beginning on 29th September 1965. The lecturer will be Mr W. Hazell of the

Ministry of Aviation. The fee is £1. Further details may be obtained from the Head of School of Liberal Arts, Ealing Technical College, St Mary's Road, W5.

Basic Course in Special Librarianship and Information Work

A course of lectures intended to meet the needs of new entrants to special library and information work will be held at the Department of Librarianship, Manchester College of Commerce, on Tuesday evenings from 6 to 8 p.m., beginning on 28th September 1965. Enrolment will take place at the College, 103 Princess Street, Manchester 1, on Tuesday 21st September between 6 and 8 p.m.

Course for Architectural Librarians

Northumberland County Technical College has arranged a one-day course on 14th October on the informational needs of the builder and the architect, with special reference to the Sfb/UDC classification. The fee is 2 guineas, and the number of participants will be limited to twelve. A brochure giving full details can be obtained from the College, Hawthorn Road, Ashington, Northumberland.

SLA Scholarships

The Special Libraries Association is offering several scholarships, for the academic year 1966–67, for graduate study in special librarianship leading to a degree at an accredited library school in the USA or Canada. Applicants must be graduates working (or, if newly graduated, intending to work) in special libraries and have a definite interest in and aptitude for special library work. They must also prove the financial necessity of the scholarship and be provisionally accepted at an accredited library school in the USA or Canada. Forms may be obtained from the SLA at 31 East 10th Street, New York 10003, and must be submitted no later than 1st February, 1966.

40th Member of FID

The Australian Commonwealth Scientific and Industrial Research Organization (CSIRO) has applied for national membership of FID. The admission of CSIRO will bring the total national membership of FID to forty.

Air Pollution Research

The Center for Air Environment Studies of the Pennsylvania State University has recently announced a new reference tool, the *Index to Air Pollution Research*. This Keyword-in-Context index to current government-supported research in the United States and abroad is now available at $1.25 per copy from the Center for Air Environment Studies, 301 Engineering Unit 'C', University Park, Pennsylvania, USA.

Translators and Translations

The second edition of *Translators and Translations,* published by the Special Libraries Association, is now available. This edition is much larger and now covers thirty-seven countries, and includes separate lists of freelance translators, translating firms, translations pools and indexes, subject, geographical and publication indexes.

Information is restricted to that given in reply to a rigid questionnaire, and is heavily abbreviated. A main geographic arrangement would have been an advantage, but nevertheless this new edition will prove useful to meet the steadily increasing demand for information about translators and translations. It is available from the Special Libraries Association, 31 East 10th Street, New York 10003, price $14.50.

Classification Society A.G.M.

The annual general meeting of the Classification Society will be held, together with a symposium on 'Classification and Information Retrieval', on Thursday 7th October 1965, at Northampton College of Advanced Technology, St John Street, London, EC1, starting at 10 a.m. Mr J. Farradane, Mr B. C. Vickery and one other to be arranged will speak at the symposium. The cost of meals (including coffee, lunch and tea) will be 12*s* 6*d*, payable at the meeting. Those wishing to attend should notify the Secretary, Mr J. S. L. Gilmour, at the University Botanic Gardens, Cambridge, before 25th September.

OSTI Survey

The Office of Scientific and Technical Information (OSTI) will be conducting a national survey by questionnaire in order to obtain data, estimates and views on the staffing of information departments and special libraries. Two questionnaires will be sent, a short one for management and a longer one for individuals employed in information work. To preserve anonymity names of organizations and individuals will not be asked for. Anyone concerned with information work who did not receive a questionnaire by 31st July may obtain one from OSTI.

Libraries and the Book Trade

The North-Western Polytechnic School of Librarianship will hold a one-day conference on Libraries and the Book Trade on Wednesday 24th November 1965. The conference will take place in the hall of Holborn Central Library and representative publishers, booksellers and librarians will speak on topics which will give librarians and members of the book trade opportunities to discuss their common problems. A prospectus may be obtained from the School, Prince of Wales Road, London NW5.

Midlands Branch Meetings

Will members please note that the meetings arranged by the Midlands Branch for Tuesday 21st September, Wednesday 27th October and Tuesday 14th December have all been cancelled.

Mr Jack Mills

Mr Jack Mills, who for the past three years has been Deputy Director of the Aslib/Cranfield Research Project, has extended his leave of absence from North-Western Polytechnic for a further year to take the post of Visiting Professor at a new school of librarianship at the University of Maryland, U.S.A.

PUBLIC RELATIONS: HOW TO CREATE MUTUAL UNDERSTANDING BETWEEN AN INDUSTRIAL INFORMATION SERVICE AND ITS CLIENTELE

R. HINDSON, A.L.A.

Information Officer, Colvilles Limited

Paper presented at the Aslib (Scottish Branch) Annual Conference, Friday, 19th March 1965

THE Institute of Public Relations defines the practice of public relations as 'the deliberate, planned and sustained effort to establish and maintain mutual understanding between an organization and its public'.[1] Although this definition is clear and concise and its implications are readily understood by people active in the field, it does not really make clear that public relations is primarily concerned with people as individuals. In any kind of social activity or investigation it is very tempting to divide people into groups. Group identification is a useful preliminary to further activity and research. Such identification is certainly useful to an industrial information service since the clientele is divided into groups almost automatically by the reason of their function, e.g. accountants, engineers, executives, managers, metallurgists, research scientists, technologists and so on.

Some of us here today will have been described at times as information workers, special librarians, or perhaps information scientists. Although superficially we are probably alike, each individual's field of activity, responsibilities and methods of working will probably present a unique picture. Anyone attempting to win our understanding in the public relations sense would probably have a difficult task if we were merely regarded as a group with little or no differentiation as individuals. In the closed community in which an industrial information service operates, it is vital to regard the clientele as individuals rather than members of various groups. From the same standpoint it is also vital to regard the information service as a number of individuals, not a group of people. The prime purpose of public relations in this context is the creation of mutual understanding between the individuals in the information service and the individual clients, actual and possible. The creation of such mutual understanding is only possible if adequate channels of communication exist. It is due to the realization that this is so that in recent years public relations practitioners have come to regard the establishment of good communications between an organization and its public as being an important part of their work.

In so far as communication itself is concerned, anyone who followed Professor Colin Cherry's recent television series will be acquainted with the breadth and depth of the subject. In spite of this, and although public relations is a developing field of activity, various methods of establishing communication channels between the individuals active in an organization and individual members of the public have become accepted. It is the purpose of my remarks this morning to draw attention to these various methods which can be used to develop mutual understanding between an information service and its individual clients. Information work is at present a 'growth industry' and it is more essential than ever that every client, actual and possible, of the information service should be given the opportunity to understand its basic functions and activities, so that he or she will be able to make better use of the service's resources.

The functions of the information service of an industrial group can be briefly given as:

1. To find, assess, disseminate and store all recorded information, published or not, of value to its parent organization.
2. To assist in the maintenance of channels through which ideas and information from other industries can flow into the organization concerned.
3. To assist in providing means by which information collected in one part of the group is available to other parts.

At the present time an information service fulfilling these functions on a company or group wide basis under the aegis of a research department may undertake all or any combination of the following activities.

(*a*) Library services. The procurement, circulation and storing of needed material. This is likely to be in various physical forms, e.g.

Books and pamphlets.
Periodicals and newspapers.
Trade catalogues.
Standards and specifications.
Patent specifications.
Films, slides, photographs.
Maps, charts, atlasses.
Translations.
Microfilms and microcards.

(*b*) Information services to the various groups of managers, technologists and scientists employed by the company or group, including the publication of information bulletins, booklets, abstracts and so on.

The service can be divided thus:

(*a*) Technical.
(*b*) Commercial.
(*c*) General—Personnel, Education and Training, and so on.

There will be central information files and indexes to support the dissemination services.

(*d*) Care of the research department's correspondence and memoranda (except personnel and managerial material).
(*e*) Editing and physical production of research reports and other research publications.
(*f*) Filing, indexing and dissemination of research reports, internal and external.
(*g*) Translation services.
(*h*) Public relations work and publicity on behalf of the research department.
(*i*) Organization of internal colloquia, symposia and film shows.

It is impossible for an information service to fulfil satisfactorily any of the given three functions by undertaking any of the named activities unless mutual understanding exists between the staff of the information service and the individual clients. Both the information workers and the clients must understand precisely which of the clients' information requirements are to be met by the information service and how they are to be met. Both sides must understand the limits set to the operation by the management. Everyone should be fully aware that the desirability of carrying out certain information activity can only be judged in terms of the contribution which it will make to the efficiency and therefore the profit of the company or group. By applying public relations ideas and techniques, the information officer of an industrial company will be able to develop his service to a far higher level than is possible without the use of such ideas and techniques. Also, he or she will find that the task of establishing, developing or running an information service will be made much easier. Good public relations is a lubricant.

Basically, public relations activities fall naturally into three categories:

1. Research.
2. Planning.
3. Action.

Research, planning and action are not isolated activities, each occupying a separate section of a time cycle. They are integrated activities forming part of a continuous and unceasing operation, once the public relations campaign is under way. However, when public relations is being used for the first time, research is a separate phase of the public relations operation, and in fact the more time it is possible to spend on research in the first instance the better the resultant planning and action will be.

Research in public relations falls naturally into two areas. The first area of research is concerned with the actual organization which is to be the subject of the public relations campaign. I do not wish you to think that I am being unduly cynical or cautious, but I think that among the basic factors about which the information officer needs to know are the management's policies and objectives for the information service. Many information services have developed over the years in a haphazard way and undertake quite a large range of activities without these being properly authorized by the management of the parent company. It is quite possible to build up a large and expensive information service without the top management of the company being really aware of what the service is trying to do.

Therefore, it is vital that the information officer discusses with management the objectives of the information service. A clear definition of the people who are to be the clients of the information service must be achieved. Euphemistic descriptions such as 'every member of staff' and 'senior management at every plant location' should be avoided.

It is essential that the role of the information service in the particular organization should be clearly defined and authorized by the management, and also that the funds available should be authorized in accordance with company practice. This part of the research will no doubt involve a lot of discussion with management and may well lead the management to realize that the maintenance of an adequate information service is quite expensive. It is quite possible that the information officer will be led to realize that some of what he is actually doing is not what he is supposed to be doing. Such discussions with management will help those very small information services who attempt to achieve the impossible, such as serving all the technical staff of a given company who may number some hundreds, or to provide a service for the staff of a widely dispersed company without access to adequate communication tools such as telephones and telex. Once the management and the information officer have agreed on policy affecting the information service, all the available data, facts, reports and histories regarding the information service, records of previous public relations activities, and all data that is relevant should be collected and assembled in a reasonable order.

Having examined the policy and internal organization of the information service, it is also necessary either concurrently or subsequently to collect all the possible information that is available regarding the clients and possible clients of the information service. By 'everything possible' I mean just that! I remember reading many years ago in a book regarding the training of aircrew that it was necessary for the instructor to know everything possible about the men he was training, even down to such details as what they might or might not eat for breakfast. One needs to know not only about the man himself, but if he is responsible for a plant, what kind of plant it is, type of equipment, its capacity, its products, its problems and so on. If the client is a specialist, one should know about what he is doing, his equipment, his plans for the future, and his precise function in the company.

In these days of research associations, industrial liaison officers, and so on, it is vitally necessary that the information officer ascertains to what services each individual has access. For example, in our industry, the individual executive may well receive from the British Iron and Steel Federation the select list of abstracts of British patent specifications which are thought to affect the interests of the industry. Because of this it may be that an individual executive does not wish to be informed of details of British patent specifications by the information service. Many central organizations of the iron and steel industry issue abstract bulletins which cover in whole or in part the interests of a particular executive and it is essential to establish precisely which clients utilize which bulletins. It is also useful to know which periodicals each client reads regularly.

When one is gathering this information it is important not to waste one's time gathering information already available. For example, in so far as data regarding individual plants or works is concerned, much can be obtained from the company's press releases, work guides and so on. Much useful information is now available regarding the kind of use an individual might make of libraries and information services. Aslib has recently issued the preliminary results of some research on this subject.[2] Knowledge of such work will assist the information officer during the investigation of clients' current information gathering activities.

In general, of course, it is commonly accepted that the information officer and staff of the information service should be as knowledgeable as is humanly possible about the activities of the company by whom they are employed. I think that while many information officers are extremely well acquainted with the technical and scientific activities of their companies, their knowledge of the commercial and sales side of their companies sometimes leaves something to be desired. It is vitally necessary that the information workers are as fully acquainted with the commercial and sales activities of the company as they are of the technical and production activities, since in these days of computers and so on, the two sides are becoming much more closely integrated and information of use to one side is certainly often very valuable to the other. Probably the best way to obtain a detailed understanding of the activities and possible future developments of a works or a department is to visit the executive concerned and ask him for the relevant information. Such visits, although basically a part of the research activity, are very often a first step in establishing mutual understanding between the information service staff and the individual clients. The information garnered during such visits should be properly recorded in the form of a report for future reference. If the information service maintains interest profiles then the relevant information should be integrated into them so as to render them more complete.

Once a very detailed dossier of facts has been compiled one can begin to plan. Very often the facts themselves will suggest the form of the plan and various details that should be included. The plan should take cognizance of what is being done, and what can be done. It is essential that the plan be written down. Only a written plan can be properly discussed, and agreed to, by the management and the staff of the information service. The plan must cover the following points:

1. The general objective.
2. Details of the present position, particularly shortcomings.
3. The precise problems which it is hoped will be solved.
4. The contribution which public relations will make to the solution of the problems.
5. Who is going to carry out the programme.
6. The general administration and timing of the plan.
7. The media to be used.
8. The cost.
9. Action to be taken if demands develop beyond the present capacity of service.

The general objective of the plan will of course have been established during discussions with the management as to the objectives of the information service, modified by what is being done and what can be done. For example, the general objective of an information service intended to serve research and development workers could be to ensure that all such workers employed by the company are made aware of work relevant to their activities. The precise problem may well include the following:

1. Some of the research and development workers are not aware that an information service exists.
2. That if they are aware that it exists, they prefer to use other sources of published information.
3. The research and development workers may think that the information service is not capable of providing them with any help.

There are other similar difficulties which often inhibit the use made by research and development workers of the company information service. Many such difficulties are due to faulty communication which in turn leads to lack of understanding.

In a large industrial group the objective of the information service may well be to ensure that all executives are kept abreast of relevant developments as described in the literature. The public relations plan of such an information service must detail the problems which exist or are likely to arise and what contribution public relations may be expected to make towards their solution. The basic problem is to organize matters so that each executive in general understands how the service operates, its coverage and its limitations, and has a detailed understanding of any particular facets of the whole operation which interests him. So far in Colvilles we have utilized the Annual Report of the Central Research Department, a confidential document distributed to all executives by the Research Manager; specialist reports on matters such as the handling of research reports received from the research associations supported by the Group; visits to the executives in their works and offices; and immediate answers to questions such as 'how does the costing system for translations work?' All this is based on the premise that the service is theirs in the sense that it operates for their benefit and therefore the more the executives understand its working the more efficiently will they use its resources.

The plan should detail the media to be used and how those selected are to be used. Media is a term constantly used in public relations but all that it denotes are the various means by which a message may be transmitted to the public of an organization. Newspapers and television are familiar examples. In our specialist field we have some unusual media: abstract notification sheets, library bulletins, noticeboards, bookplates, date labels, periodical circulation labels, and so on.

All the media used by an information service creates an 'image' in the mind of the client. The development of understanding will be considerably assisted if the image is crisp. It is therefore important that the media used are attractive and reflect the application of an integrated design policy. If the company employs or retains design or publicity experts, their advice should be sought and taken.

Such guidance will result in the information service media being distinctive but also clearly related to the company design policy for its other media.

The plan must give in detail the expected cost of the public relations programme. When one is estimating the cost of a programme for an organization which utilizes all manner of techniques and media in its day-to-day operations certain difficulties are met. In many instances almost the whole of the media costs will be met by redirecting expenditure rather than incurring additional expenditure. However, if it is proposed to use certain media which have not been employed before then these must be costed accurately. All other costs such as the cost of staff time involved, travelling expenses, manufacture of exhibits and noticeboards, and so on, should all be worked out where possible, or a reasonable guess made.

As good public relations is continuous and sustained, the plan should note how the research and planning functions are to be continued while the programme is being implemented. It should be clearly stated that if the continuing research indicates that alterations should be made to the programme, then they will be made.

A time-table must be included in the plan. It is essential that it should be as detailed as possible and not airy-fairy in any way. As with research, planning must be done in detail and the better it is, the better the final effort.

Having completed the initial research and the basic plan, the time for action arrives. The first essential is to explain to the staff of the information service what is going to be done, when everything is going to be done, and who is going to do it. Each member of staff must clearly understand what he or she is expected to do.

The programme must be implemented strictly according to the time-table. One begins by putting one's house in order. Basically this means that the resources of the information service are so organized that the general objective given in the public relations plan can be achieved without failure in any direction.

If the research has been properly carried out, the task of putting the house in order will be simplified. This is because the organizational faults of the information service will have been clearly identified. In some instances research will disclose that organization faults are a major part of the problem. In such cases, managerial action is required, not the use of public relations.

It has been said that good timing is the essence of public relations.[3] Good timing is achieved by keeping closely to the time-table and allowing for flexibility in the inevitable emergency or changes of plan.

For example, the plan may call for the appearance of a descriptive article in the company's house magazine, in a certain issue, perhaps the spring issue. It may be that somewhat unexpectedly a great event, perhaps even a royal visit, takes place and is to be recorded in that issue. If so, the descriptive article would probably be somewhat overwhelmed by the photographs and descriptions of the great event, and better included in a later issue of the magazine.

Everything that requires preparation should be completed well in advance, otherwise last-minute crises may arise. In information and library circles there is a lot of ill-informed opinion expressed about saving money by organizing one's own designing and printing. Actual details of design and printing are best left to the experts. If there is only a small amount of money available to spend, it is better to have one item done well than several done badly. In any case, good design and printing is far cheaper than is generally realized, particularly if the work is carried out by firms normally employed by the company for this kind of work. This will ensure that printed material intended for the information service will be integrated with the company's general house style.

It may be that third party endorsement is not a familiar term. A good example is the series of Lux soap advertisements, where a current film star tells us how good for the skin Lux soap is. It is important that our work receives such endorsement from our peers in other organizations. Thus papers presented at professional meetings such as this one can be used in a public relations campaign. One should bring the paper to the attention of those clients most likely to be interested. Most people are interested in reading about a facility which they use themselves.

It is important that the results of the public relations programme be measured. Both the effectiveness of each individual technique and the total effectiveness of the whole programme must be judged. This is an area of public relations practice which is not yet fully developed, but fortunately it is easier to measure results in a relatively small closed community such as the clientele of an industrial information service than it is in some other instances. In most instances it will be sufficient to record the before, during and after demand made on the various facilities available. For example, if the issue of material increases but the number of clients remains constant, there is something wrong. If the issue increases in proportion to the increase in clients, then the programme is at least correctly based.

In Colvilles we have evolved a system which enables us to assess the impact of each abstract selected for notification to our clients, the executives of the group companies. This was designed into the system from the beginning. In contrast, Peter Hoey, Information Officer of Richard Thomas & Baldwins, Ltd., another major steel company, has been able to institute a system whereby the impact of his department's long-established bulletin, entitled *Technical Abstracts*, is assessed. In June, 1964, a standard Request Form was introduced. This form is now included in every copy of *Technical Abstracts* distributed. The purpose was twofold. Firstly, the form reduced the effort needed to request the loan of an article; only a number need be written on the form. Secondly, analysis of the requests, which would not be readily to hand, should show a pattern which would help to decide the future abstracting policy. Some trends are apparent, viz. the tendency of corrosion and analytical workers, ironmakers, coke oven men to rely on their own sources of information and not request articles from the Library and Information Department as a result of reading *Technical Abstracts*. This could imply (*a*) receipt of journals 'locally' prior to receipt of *Technical Abstracts* or (*b*) requesting articles through 'local' branch libraries or (*c*) complete lack of trust in the abstracting service. The survey is now being extended to break down the requests into sections and personnel to show whether people are regular in their requests, whether they continue using once started, how long after an issue is received they make a request.

Research into the effectiveness of the programme together with continuing basic research must be regarded as an essential part of the public relations programme. Without such research the whole operation is likely to become meaningless and may well fail. It will not be possible to alter the plan and thus the action if research is not a continuing part of the programme. Continuing research and planning are essential to a successful public relations programme and should be regarded as an essential part of the action. They are, in a sense, the servo mechanisms controlling the programme once it is under way. There is no substitute for a continuing process of observing reactions and then adjusting communications accordingly.[4]

Research, planning and action are then the essential components of a public relations programme. Each must be thoroughly carried out if the staff of an industrial information service are to create mutual understanding between themselves and their clients.

But in themselves, research, planning and action are not enough. Good public relations is rather the correct outlook than the use of selected techniques. The basis of public relations in information work is personal service to individual clients. The selective use of public relations techniques based on a clear understanding of the purpose of public relations enables the information worker to fit all activities in the field of communication into a recognized structure. Most industrial information workers are so hard pressed that they must choose what they will do. By applying public relations principles and practices they can be sure that their efforts are concentrated on the important problems, not diffused over a range of sometimes unrelated activities. The fact that they are able and willing to apply public relations principles and practices indicates that they have the correct outlook. The information worker with such an outlook is primarily concerned that his efforts and those of his colleagues are primarily directed towards the efficiency and profit of his company.

A deliberate, planned and sustained public relations programme designed to create mutual understanding between the information service and its clients will enable each information worker, be he information scientist, librarian, translator or what have you, to make a larger contribution more quickly to the profit of the company than would otherwise have been the case.

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COMMUNICATIONS

Summary of a paper by

E. A. MARSH

Group Training Officer, Reed Paper Group

Evening meeting, London, 14th April 1965

MR. MARSH began by emphasizing the importance of establishing communications, which he defined as 'a genuine, satisfying two-way exchange between persons'. It is establishing a relationship—putting oneself into the shoes of another person—trying to understand how he, or she, feels—communicating so that they will act on what is said, or written, or shown.

To communicate effectively we have to be fresh, original, different. Above all, we have to know ourselves; to know our strength and our weakness—and to combat those weaknesses we have.

One of the main causes of failure in communication is too much talk without thought, without preparation, without organizing our approach. We expect communication to follow 'as the night, the day'—but it doesn't. We must always carefully consider what 'feed back' we are going to get. If we don't, we risk being misunderstood. If we are misunderstood, this may well engender mistrust in some form. Where there is mistrust there will not be good, effective communications!

Most of us need to think much more about the emotional aspect of communication rather than of just the cold, logical facts. We need to consider how our words (or actions) reflect what we mean to communicate! Words may convey different things to different people at different times. There are words which degenerate in meaning—what Theodore Roosevelt called 'weasel words'. Take the word 'democracy' for example. It used to be a respectable word meaning a certain method of making political decisions. Lately, however, it has been used as though it simply meant a good form of government or even the only form of government. It has become the label which almost every regime, from Herr Ulbricht's to President Johnson's, from Nkrumah's to Verwoerd's, feels free, and obliged, to claim. In fact they all call themselves democracies—but are they? We tend to twist words to mean what we wish. This is fair enough if the speaker is fully aware that he, or she, is doing it, but spoken English seems a lost art. The most important single factor in communication is sincere belief in the 'message' to be transmitted. Once Louis Armstrong was asked to define what he meant by New Orleans jazz, and Satchmo looked up and said: 'Brother, if you gotta ask, you'll never know!' This applies to communications. Somebody said of Montgomery that he had 'the power of seeing things with intensity and communicating that intensity to others'. This quality has been described as incandescence. This is a vivid word. It means a lot. It indicates a 'glow' of communication—a sustained wish to pass on messages or ideas.

As has been said already, communication is a satisfying two-way stream between people. It is not just one-way. There must be a reaction—what is called 'feedback'. Research has shown that people will not remember things they do not want to remember, but will remember things which might benefit them. To communicate, a receptive atmosphere must be created so that ideas may be received, accepted and understood, recalled and acted on.

The objectives of communication are quite simple. There are four: to be understood, to be accepted, to get something, and to understand others. But there are barriers which get in the way, barriers between people who serve (e.g. the Information Officer) and those whom they serve—barriers such as personal dislikes, or mistrust. So many things may create an atmosphere of dislike, and trivial matters breed distrust. Personal feelings often impede communication—our moods, our attitudes, our appearance, our speech, our acts. Appearance, for example, can be deceptive and can influence judgment; either to help or hinder communication; so can built-in prejudices. Robert Owen once said: 'All the world is queer except Thee and me and even Thou art a bit queer'.

How can barriers be surmounted? One way is by appreciating the need for effective planning of communications, by having the desire to find the best way, by using all the techniques by which this may be achieved, and by remembering that the spirit of the communication is the most important element. Once this is appreciated, the next step is to think straight—to think logically through arguments; then to apply the emotional aspect, and find a way to convey the meaning feelingly, as well as clearly and concisely—not to use jargon, but clear simple words. The important must not be mixed up with the unimportant; nor must too little (or too much) knowledge on the part of the listener ever be assumed. One must always establish how much is known.

This is to exercise what is called empathy—'the power of projecting one's personality into, and therefore understanding, the object of contemplation.' To communicate successfully, one has to use emotion positively and to be perceptive, to watch the use of emotive words and phrases, to arouse interest in the listener by motivating him, or her, to give attention, to tailor-make communications to suit each listener or reader, to watch, too, *how* a thing is said, as well as what is said, taking note of expressions, mannerisms, etc.; watching for responses, involving the listener or reader in the subject; personalise, illustrate, ask for opinions, respect and use them when given; respond; stay tuned in. Take care to interpret and evaluate all these responses, if need be by asking questions. The best story one can tell to explain empathy is the story of Eleanor Roosevelt at the reception after her husband's funeral, with Harry Truman, who said to her: Is there anything I can do for you, Eleanor? She looked up and said quickly: No, but is there anything I can do for you, Harry? Her sorrow was still there, and her load, but she could realize that Harry Truman now had problems far outweighing her own, and she could switch, immediately, from being sorry for herself to offering help. This is real empathy. To exercise empathy you have to use emotion positively, be perceptive, be aware, be sensitive to atmosphere, to check all your communications against five questions: What? Why? How? When? Who?

To sum up: all communications have a single basic purpose—establishing or improving understanding between you and someone else; the acceptance of your communications will stand or fall by the sincerity of your actions.

NOTE.—Some of the material in this paper is based on the film *More than words* made by Henry Strauss & Co., New York.

Letter to the Editor

THE PACIFIC AEROSPACE INDEX

Dear Sir,

The Pacific Aerospace Library of the American Institute of Aeronautics and Astronautics has recently distributed some descriptive literature concerning their new *Pacific Aerospace Index*. Although this information appeared to be comprehensive it did raise a few queries on which I have just obtained clarification from Mrs McCandless of PAL.

Since the cost (£90) is relatively high, careful consideration is necessary before deciding whether to purchase or not. Consequently I am forwarding the main points of the letter I received from PAL in the hope that the information may be of value to other libraries:

> 'May I clear up a few points before launching into a more lucid description of the newly revised *PAI*? This Index in no way competes with *International Aerospace Abstracts*. There is, roughly, a 40 per cent duplication of periodical titles covered. This, however, is a deceptive statistic; AIAA makes a well-publicized point of "selective" coverage. If you review the list of periodicals scanned and the selection of articles chosen for abstracting you will find that one title out of several issues may be the only item chosen for inclusion in *IAA*. Their tight definition of "aerospace" provides parameters of selectivity which preclude all peripheral information. PAL exercises selectivity in the periodicals indexed, but indexes articles from these selected journals in across-the-board coverage. The only exception to this completeness of coverage occurs in those "news" magazines, e.g. *Aviation Week,* where reportage rather than scientific thoroughness governs editorial policy.
>
> '*IAA*, as you know, gives broad subject coverage only. There is no attempt to provide detailed handles to specific subject relationships. *IAA* is a fine source of broad subject treatment; but it, by defined function, does not *index* subject information.
>
> 'PAL, on the other hand, not only indexes, but indexes in depth. The PAL *Index* offers a fine cross pollination of subject relationship. The two publications, far from competitive in nature, are indeed complementary.
>
> 'I was particularly interested in your comment on our (American's) preoccupation with the machine generated indices. It is true that the *PAI* uses first the simple key-punch machine for input, and then utilizes a computer for the *Index* printout and permutation. However our use of automation ends with these two machine functions. The attractiveness of our *Index,* we feel, is largely attributable to the fact that it is designed for manual search. No

magnetic tapes are generated; no "memories" created for storage and retrieval. We have used the machine as a time and labor saving device only. Indexing is done by experienced librarians and the finished product demands nothing from the user save the translation of an information demand into its simplest and most specific terms.

The Format of the *Index* is simple. Let me illustrate. The Indexer is indexing the *Journal of Basic Engineering,* March 1965. An article by J. Eftis, page 257–63, is titled: Comparison of the initiation with the rapid propagation of a crack in a mild steel plate: (accessions number 21661). Title, abstract and article are scanned and the descriptors, CRACK PROPAGATION, STEEL, PLATES, STRAIN HARDENING, and FRACTURE are selected as covering the contents of the article. These descriptors are key punched with the accession number and *each* appears in the *Index* as a major heading, with all the other associated descriptors following. The unique accession number accompanies each. This permutation permits the searcher to find the pertinent article from any one of five (in this case) access points. It further *qualifies* the content of the article by preco-ordinating all of the conjugate or associated terms. Each succeeding article on any one of these subjects is added to the major heading—and additional qualifying associated terms are appended. As with accession number 22106 (whose descriptors are, HIGH STRENGTH STEEL, CRACK PROPAGATION, FATIGUE, HUMIDITY, STRESSES) and with previously indexed accession number 21658 (descriptors assigned, CRACK PROPAGATION, FATIGUE, HIGH STRENGTH STEEL, STRAIN HARDENING). These three indexed articles, to illustrate further, will appear in the *Index* under each of these descriptors with all others following, permuted and hence complete. There will be three citations (accession numbers) for CRACK PROPAGATION; two each for HIGH STRENGTH STEEL, STRAIN HARDENING, FATIGUE, etc., and one each for PLATES, HUMIDITY, etc.

'Each descriptor used in indexing is so treated and as the *Index* cumulates not only does a complete bibliography of each heading appear in *one place,* but the additional and necessary qualifying terms provide absolute specificity of content.

'We feel it both a unique and an exceedingly useful tool, and welcome both comment and suggestions for furthering its role as a ready access volume to detailed and current information in the broad aerospace field.'

Yours faithfully,
N. UPTON,
Librarian/Information Officer,
Advanced Projects Group.

Hawker Siddeley Aviation Limited,
Richmond Road,
Kingston-upon-Thames
11th August 1965

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

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The charge for advertisements in these columns is *4d* per word, minimum *5s*. An additional charge of *6d* is made for the use of a box number.

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TRANSLATIONS FROM TURKISH. All subjects. F. P. Scott, 4 Uphill Grove, Mill Hill, London, NW7.

TRANSLATIONS: TECHNICAL, SCIENTIFIC, all west-European languages. J. Smuts, B SC (ENGINEERING), FIL, 12 Thorndene Avenue, London N11. LABurnum 7723.

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LIBRARY ASSISTANT (INTERMEDIATE), female 19–26, required for Technical Library situated near Tadworth, Surrey. Applicants should have previous library experience and have passed the First Professional Examination of the Library Association. Some typing necessary. Please apply Assistant Personnel Manager, Vitamins Ltd, 23 Upper Mall, London W6, quoting ref.: LIB/WO.

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Two named books are taken as examples, one a high-priced symposium volume, and the other a cheap text for students.

The author concludes his article with a short discussion of the economics of paperback publishing.

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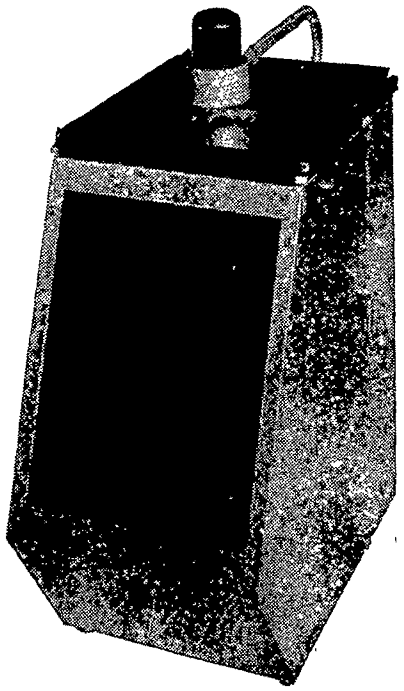

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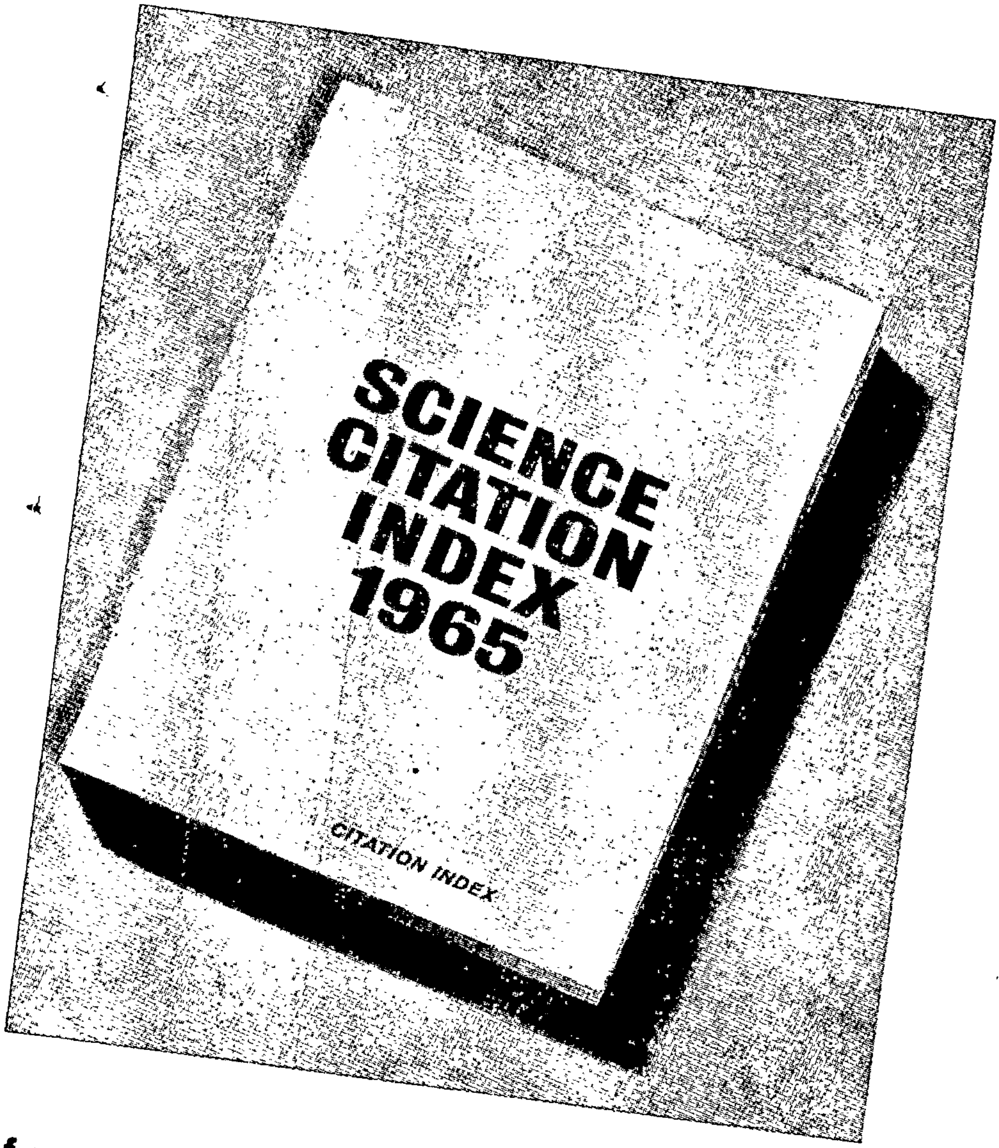

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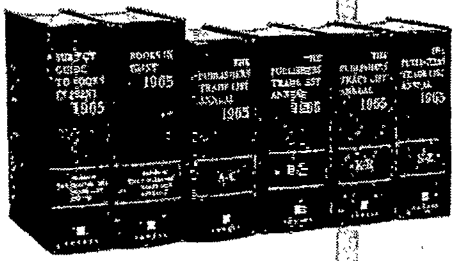

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Volume 17 **October 1965** **Number 10**

ASLIB CALENDAR 1965

October

TUE.12 – FRI.15.	Course on film librarianship.
WED.13 – WED. 15 DECEMBER	Course on handling Soviet and East European materials. Wednesday evenings.
THUR.21.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Advance thinking by a technical publisher', by T. H. Clare.

November

WED.10.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Convincing our customers of the importance of information services', by J. H. Mackay-Whitton (Tack Organization, Ltd). See paragraph below.
RI.12 – SAT.13.	Scottish Branch training course. See paragraph below.
UE.23.	Engineering Group meeting. Speaker: Sir Robert Wynne-Edwards, Chairman, Council of Engineering Institutions. See paragraph below.
HUR.25 – FRI.26.	Course on the Trade Literature Collection. See paragraph below.
UE.30.	Chemical Group meeting. 'Mechanical handling of chemical information', by E. Hyde, ICI Pharmaceuticals Division. See paragraph below.

ecember

ED.22.	Christmas cocktail party at Aslib.

1966

ebruary

ED.16.	Midlands Branch meeting, Coventry.

arch

I.18.	Scottish Branch annual general meeting, East Kilbride.
E.22.	Midlands Branch annual general meeting, Birmingham.

ptember

N.25 – WED.28.	40th Annual Conference at Scheveningen (Netherlands).

Aslib Evening Meeting

A meeting will be held at Aslib on Wednesday 10th November at 5 o'clock. Mr J. H. Mackay-Whitton, Director and Head of Training at the Tack Organization Ltd, will speak on 'Convincing our customers of the importance of information services'.

The problem of convincing our potential customers, from management to apprentices, is one which concerns most members. This can be regarded as a problem of selling ourselves and our services, and we believe that members can benefit from expert knowledge of salesmanship. We have therefore invited Mr Mackay-Whitton to outline the philosophy behind selling and to describe some of the techniques of salesmanship in a manner which may be of use to everybody.

Mr Mackay-Whitton is ideally suited to give this talk as he is 'Headmaster' of one of the best-known schools of selling in the world.

The Trade Literature Collection

Trade catalogues and related publications often contain valuable information which is not available from other sources. Yet they are often overlooked and neglected owing to the difficulty of obtaining them and of organizing and integrating them with other sources of information. Two years ago Aslib presented a course to help overcome these difficulties, and this proved very popular. This course has now been revised and extended and the new version will be held on Thursday and Friday 25th and 26th November. Lectures cover various ways of obtaining and organizing trade catalogues, the problem of indexing them, and their exploitation in information work in relation to other types of literature. The implications of recent developments in this field will be discussed. There will also be visits to trade catalogue collections of various types and a general discussion of the issues raised by the course. The fee for the course will be six and a half guineas. A programme is contained in this issue, and applications should be made on the form enclosed in it. Provisional booking will be accepted by telephone or telex.

Engineering Group Meeting

The Group has been fortunate in obtaining as its speaker for the first meeting of the new session, on Tuesday 23rd November at 6.30 p.m., the Chairman of the Council of Engineering Institutions (formerly Engineering Institutions Joint Council), Sir Robert Wynne-Edwards, who will address the meeting on the activities of the CEI. This will be followed by an informal wine and cheese party which will give members an opportunity to meet Sir Robert. The Director of Aslib, Mr Leslie Wilson, will take the chair for the evening.

Tickets are obtainable at *7s 6d* each from D. P. Woodworth, Group Secretary, PLA, Room 223, Trinity Square, London EC3. Invitations will be sent to all Group members in due course but a warm welcome is extended to the membership of Aslib at large. Due to space restrictions it is regretted that numbers will be limited to fifty and preference will be given to Group members.

Chemical Group Meeting

There will be a meeting of the Chemical Group on Tuesday 30th November at 12.30 p.m. Members will assemble at the Anglo-Belgian Club, 6 Belgrave Square, SW1, for lunch, which will be followed at 2.30 by a talk at Aslib on 'The mechanical handling of chemical information', by Mr E. Hyde of ICI Pharmaceuticals Division. The cost will be 17*s* 6*d*, excluding drinks. Will those wishing to attend please contact the Secretary, Mr J. S. Rippon, Research Department, Metal Box Company.

Scottish Branch Training Course

As announced in the August issue of *Aslib Proceedings*, p. 236, the Scottish Branch is arranging an Information Course at the Allan Water Hotel, Bridge of Allan, on Friday and Saturday 12th and 13th November to which all Aslib members and their associates are cordially invited.

Six papers will be presented under the overall theme of 'Help from your Neighbour'.

On Friday 12th November:

'Information retrieval systems—the old and the new', by J. R. Sharp, Library and Information Services, ICI Fibres Ltd, Pontypool.

'The other side of the coin—how the special library can help the public library', by D. W. Bromley, Librarian in Charge, Libraries of Commerce, Science and Technology, Sheffield City Libraries; Honorary Assistant Secretary, SINTO.

'Help to local industry', by H. I. Hunt, Borough Librarian, Motherwell and Wishaw Public Libraries.

On Saturday 13th November:

'Special materials in special libraries', by D. Mason, Deputy Head, Library Department, Dyestuffs Division, ICI Ltd, Manchester.

'Stock provision problems in area and depth', by H. A. Chesshyre, Senior Tutor Librarian, Hatfield College of Technology.

'A client's viewpoint—what the specialist requires from the library', by Dr P. R. Thomas, Scottish Horticultural Research Institute, Invergowrie, Dundee.

On the Friday evening there will be a general discussion on 'Adapting Systems to your own Requirements' for all those attending the course.

The inclusive charge for the course (accommodation, meals, lectures and gratuities) will be five and a half guineas. Registrations should be sent, as soon as possible, to the Branch Honorary Secretary, W. H. Rutherford, Royal Society of Edinburgh, 22 George Street, Edinburgh 2.

Subject Indexes and Automatic Retrieval

The University of Sheffield has been awarded a grant of £12,714 by the Office for Scientific and Technical Information for a three-year study in the documentation of scientific information. The project, which is entitled 'Subject Indexes and Automatic Retrieval of Information', will be carried out at the Postgraduate School of Librarianship, under the general direction of its Director, Mr W. L. Saunders. The chief investigator will be Dr Michael F. Lynch.

The aim of the study is to investigate the application of computer techniques to document retrieval through the medium of existing types of subject indexes which employ relatively extended descriptions of subject matter, prepared by human indexers. The economics of multiple use of existing stores of indexed information, by humans and machines alike, are highly attractive. Preliminary studies will concentrate on the subject indexes to *Chemical Abstracts*, with the co-operation of the Chemical Abstracts Service, but the results will be extended to other indexes in science and technology.

Library Materials on Latin America

As a result of the increased interest in this country in Latin American studies, two committees have recently been set up independently to consider the improvements and co-ordination of library materials in this field. One of them, the Committee on Latin America, was set up at a meeting at Canning House, called by Sir John Walker, the Director-General of the Hispanic and Luso-Brazilian Councils. The other is a Sub-committee on the Acquisition of Latin American Materials set up by the Standing Conference of National and University Libraries.

Both committees consider that their work could be done more effectively by a single, more broadly based body into which they might both be merged. The sort of arrangement envisaged is an annual meeting of interested persons and representatives of interested bodies which would appoint a small working committee and receive reports from it. It is proposed to hold a meeting to consider the establishment of such an organization at 2 p.m. on 2nd November at the National Central Library (the old building in Malet Place, or the new in Store Street, depending on the progress of the latter).

Any person or body wishing to attend this meeting or to be represented at it who has not yet received an invitation is asked to apply to Mr K. I. Forter at the National Central Library, Malet Place, London WC1 (EUSton 6262).

Patent Office

The Printing Branch of the Patent Office moved to Block C, Station Square House, St. Mary Cray, Orpington, Kent, on 4th October. The Sale Branch will follow and both branches will be in operation at their new location by 18th October. A unit of the Sale Branch is to remain in London (at the Quality Street entrance to the Patent Office, as previously) for counter sales of the current week's publications and those of the previous two weeks. As from 15th October remittances for deposit accounts and subscriptions for publications should be sent to St. Mary Cray. Further information may be obtained from the Patent Office, 24 Southampton Buildings, Chancery Lane, WC2.

SIRAID

As part of the co-operative activity within the research associations to promote wider application of instruments and automatic control in British industry, a technical inquiry and advisory service on measurement and control technology (SIRAID) has been made available at the British Scientific Instruments Research Association (SIRA). This service can be used by anyone who has a problem connected with the applications of instrumentation and control. Copies of SIRA *Impact* No. 4, in which SIRAID is described, are available from the Head of Information Group, SIRA, South Hill, Chislehurst, Kent.

British Geological Literature

This publication lists books and articles on geology and allied sciences published in the British Isles and British geological work published overseas. The quarterly issues, each containing some 250-300 items, are arranged in author order only; an author and title index is to be published annually. Entries are brief, giving author, date, title and source. *British Geological Literature* is also available in the form of separate sheets printed one side only for use on index cards. It is published quarterly, starting in 1964, by Coridon Press, 35 Goddington Road, Bourne End, Bucks. The annual subscription is £1 for either edition.

Directory of Published Proceedings

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Current Papers in Physics—A new service for physicists

Every physicist needs early information of published work, and this becomes increasingly difficult to acquire as the volume of published information increases. The Council of the IEE, in association with the councils of the Institute of Physics and the Physical Society and the governing body of the American Institute of Physics, have therefore decided to launch a new 'current awareness' publication for physicists. This new twice-monthly periodical, to be known as *Current Papers in Physics* (*CPP*), will be published by the IEE through the *Science Abstracts* Office at Savoy Place.

CPP will provide for the immediate retrieval of titles and references of new papers in physics. Its aim is to make its readers quickly aware of new information, to save their time in scanning journals and to draw attention to papers and articles in journals they do not normally see. This short-term retrieval is, of course, complementary to the long-term retrieval given by the abstracting journals.

CPP will be of newspaper format, 17 in. × 11 in., and will contain eight pages. It will be published twice a month, and will give the titles, and references of the journals in which the papers appear, classified and cross-referenced. It will cover work published in the varied fields of physics, and will list at least 1,400 titles per issue selected from more than 900 journals from all parts of the world. In general, the titles will be published within a month of receipt of the journals, and in many cases sooner than this by virtue of advance contents lists made available to *Physics Abstracts,* the monthly abstracting journal in physics published by *Science Abstracts.*

The service offered will be backed by the full resources of *Physics Abstracts.* Two promotional issues will be published and distributed free to physicists and others. The first will appear in mid-November 1965 and the second early in December. Regular publication will start with No. 1 at the beginning of January 1966. Further information will be available next month, including the annual subscription, after which remittances may be sent to the *Science Abstracts* Office, Savoy Place, London WC2.

Wanted for Aslib Library

The librarian is having difficulty in obtaining for the use of the Aslib Research Department a copy of G. K. Zipf's 'Human behavior and the principle of least effort', published in 1949 by Addison-Wesley, New York. She will be grateful for information leading to the location of a copy for disposal. Copies of the following items, now out of print, would also be gratefully received

Journal of Documentation, vol. 6, no. 1, March 1950;

Aslib Proceedings, vol. 2, 1950, index and table of contents.

Handbook of Special Librarianship

As most readers will be aware, the second edition of the *Handbook of Special Librarianship,* edited by Wilfred Ashworth and published by Aslib in 1962–3, is out of print. While a new edition is in the early stages of preparation, demand for the earlier edition continues, especially among students at library schools, for whom the *Handbook* is required reading. If any readers have copies of the *Handbook* (either edition) which they would like to donate or sell to such students, will they please contact the Liaison Officer (Mrs Sauvee), Aslib, 3 Belgrave Square, SW1.

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THE MANAGEMENT ATTITUDE TO INFORMATION

S. C. DUNN, M.SC.(ENG.), M.I.E.E.

Deputy Chief Engineer, British Aircraft Corporation Guided Weapons Division

Aslib Electronics Group, 10th July 1965

FOR convenience I will limit myself to one class of enterprise, the large engineering company. By management I mean those senior employees who form and execute policy, control finance and decide the nature of the product and how it shall be sold, in short, those whose daily operations are distinguished by a degree of remoteness from the practical and mundane affairs of the great majority of the rest of the employees. By information I mean what is communicated between these senior employees.

It is convenient to rank data, information and knowledge as successive stages through which brute facts pass. It is the characteristically human contribution to select and classify the data and to transmute the information into a powerful individual ability.

There are two information-flow systems in the company. One is concerned with the domestic problem of keeping all parts in touch with all other parts. The other makes a contribution to the firm's products.

Systemic information

Some information relates to the organizational elements and may be more or less independent of the precise nature of the work undertaken. At one end of the scale there is, for example, the medical history of a newly joined apprentice, at the other the content of a particular bin in a store holding common standard parts. To take one example, the information which describes an employee in terms relevant to the firm comprises some fifty items. This information has certain general features. Some is simply numerical, some virtually narrative in form. Some is unchanging, some must be up-dated annually or much more frequently. Some is what the company has granted the man, some he volunteers. At one time or another the man's boss will need to know everything under these headings. Often the data will be required on demand. In many companies these facts will be scattered in more than a dozen departments. The functional division of the total management responsibility has obscured the important commonality of these personal characteristics.

Technical Information

J. Z. Young has observed that the evolution and progress of Man is closely connected with his ability to communicate. The exchange of information between the company and the external world is usually well organized because the need for it is recognized. Among the agencies who participate are the library and the publicity and technical publications departments. These last two are so linked to the product and the firm's image that their existence may be taken for granted.

The library itself is entrusted with a number of tasks which are otherwise widely distributed in the firm. These include the hiring, buying, selecting, storing, marketing, consulting and distributing of information. It is only because the management takes the librarian into its confidence and explains its intentions and interests that the library is able to provide any significant amount of information. Otherwise it merely accumulates data and the gradual nourishment of the firm's abilities never takes place.

Information as a commodity

In earlier, more innocent, times, information, like Ancient Greece, was an idea in the minds of men. Now that it has become the subject of commercial transaction it has suffered the common fate of being treated as a commodity. If money is to be made out of it, information must be acquirable, extractable, refinable, storable, transmittable, inspectable, receivable, recordable, divisible, accumulable, measurable, priceable, convertible, marketable. If information can be treated like oil or tobacco it will acquire secondary features—be quoted like a stock and advertised, be the subject of competition and so on.

The interest which management has in information is basically the same as that of an individual in what he is told or finds out. One man's natural faculties—hearing, speech, memory, decision-taking—become severely taxed when he is faced with the following situation:

(*a*) a large number of correspondents
(*b*) data which must be accumulated piecemeal over a long period and then processed.
(*c*) frequent decisions which span the entire ambit between the trivial and the momentous
(*d*) responsibility for men, ideas and machines
(*e*) activities of widely diversified pace.

Arrangements for handling information in a large enterprise must take these aspects of the management situation into account. Until recently men have been used as active elements in information handling, but it has turned out that some operations lend themselves very well to mechanization and this colours all our current planning.

In spite of the many parallels which are frequently drawn between man and machine, their resemblances are rather superficial and for the most part restricted to functions. As far as we can make out, for example, the detailed organization of the brain appears to be much more complicated than any scheme yet designed to replace or improve upon it—more complicated not just in degree but in kind.

We cannot yet begin to draw the equivalent of a block diagram for mental processing, but our proposals for synthetic memories and special faculties must of necessity be simple—because, paradoxically, they are conceived by simple minds and understood by simple minds!

In the managed body, information is an essential fluid which permeates to all organs and ensures that each plays its rightful part. Management view information in much the same way as they do money. It is not only an obvious asset but is most useful when put to work. Much attention is therefore devoted to making it available, distributing and storing it, applying and adding to it. It is the basis on which decisions are made. It is important enough for the management to devote some of the company's energies to creating its own information.

What is special about the management problem that makes it necessary for information here to be treated any differently from elsewhere? Briefly it is the scale of the activity involved. While the elements necessary for personal communications are born with us, the corresponding faculties necessary for group communication have to be deliberately invented and maintained. As the number of people involved increases, the communication activity increases at a disproportionate rate. The messages, the networks and the means become diversified. If the staff are caught up in the machinery of communication in the wrong way it may prove difficult to adapt the network to the changing needs of the business. Capital is tied up in the network. Telephones, filing cabinets and typewriters can be wasting assets if they do not answer the communication needs of the firm. The time lost in passing messages may become excessive if the elements are inappropriately mixed.

Communication is such a dominant feature that the commercial enterprise can be discussed very effectively in terms of information and the results and consequences of providing for it. In order to facilitate comparison and subsequent study I have used the particular formulation used in a book by A. M. McDonough, 'Information economics and management systems', McGraw-Hill 1963.

A business is a collection of problems

Business is not unique in possessing this property. A design, a work of art, a game are similar collections. Our interest is in the part played by management. Management must *recognize* the problems, *rank* them and select the *criteria* used for solving them. It need not go as far as solving them. The fundamental problem to be solved by management itself is the creation of an *organization* for solving problems. Its success in this is to be judged in terms of the effectiveness of the organization created and how frequently it must be modified—or rather how susceptible its form is to the changes in the pattern of problems it copes with.

Problem recognition is most useful when it occurs far enough in advance of the ripe stage for the latter never to occur. It may be that problems are better avoided than solved, but where they must be met prudent preparation is better than brilliant improvization. Practice in detecting, recognizing and preparing solutions to problems is a valuable background to deciding in which order they should be tackled. Time is usually thought of as the old enemy of planned activity, but it is surprising how often judicious appraisal of the features of a problem can help enlist the calendar to our aid.

In evolving suitable criteria the manager uses his knowledge of all the factors in the business which are relevant. The problems in such a collection almost certainly interact with one another. There are probably no simple solutions, no best solutions. Even the good solutions lose their virtue with time. The establishment of criteria as a reflection of all the factors is a practical way of coping with interaction.

Organization is—assigning problems to the most qualified person

The manager of a substantial number of men with different skills finds himself in two jams at the same time. There are all these people with no suitable work to do; there is all this work and nobody doing it. There are two information aspects here. Firstly a measure is needed of the extent of this lack of congruence between men and work. A first essential is that each should be characterised by descriptions which are compatible. It is important to reach at least local agreement on what words mean. Secondly, the information required is itself a measure of the gap between what is needed to do the job and what the man is capable of. The time element is important here. The gap may be measured in terms of data, information or knowledge. The first and last of these correspond respectively to a man who can do the job and merely lacks some numerical facts and to a man who is intelligent but knows nothing relevant to the task. The first gap is closed by the library, the third in principle at least by the education and training department. The information gap probably requires assistance in both these respects. While there may be no doubt that the information is sufficiently valuable to be worth obtaining, assessing its cost equivalent may be impossible.

There is incidentally a useful by-product in measuring human performance in terms of ability to collect the proper information for a given task. Some people seem to have been untouched by the invention of printing, while others become so engrossed in collecting references that they eventually forget why they are doing it.

The most qualified person needs least information for best decisions

Management in its wisdom having broken down the business into a lot of problems and hired people who allege they can solve them must now furnish a complementary system so that they can get on with the job. This system consists partly of physical appurtenances and partly of information. It is a nice management problem in itself to decide the correct division between individual skill and information support. Two aspects are important: working level and the rate of innovation. There is great difficulty in communicating large amounts of highly diversified information accurately to large numbers of people. It is always hoped therefore that in the production department, where the greatest numbers are employed, people know how to do the job and the demands on learning are least. This hope is regularly dashed every time a new product is introduced or a modification incorporated. The resulting performance is rather like an examination of untaught candidates using question papers full of mistakes.

In that part of the organization where relative functions are customarily described by means of a diagram, it is generally understood that jobs cannot be specified in anything like the same detail. Nevertheless most diagrams indicate successive responsibility rather than channels of information. In my own experience, the vertical structure rarely creates problems for the channelling of information, but the horizontal structure—which should carry the information in a sideways direction—is often very poorly defined. Most of the intractable issues arise at interfaces. A symptom of this is the proliferation of 'liaison' engineers.

Any permanence in the division between individual ability and supporting information services is further threatened by changes in the company's policy and by advances in the various branches of the technologies that its engineers and physicists specialize in. Adjustments can sometimes be made by suitable training of the staff and new demands on the information service. Thus a view emerges of the kind of tertiary education which the world of work would prefer. This has two important features: it is biased towards what is fundamental rather than what is immediately useful, and it provides a renewal service to bring its former students up to date oftener and more quickly than is now possible.

Information is the measure of the value of a message to a decision maker

The value of a message depends both on the content of the message and on the mind of the recipient. This is frequently demonstrated when the chairman makes his annual progress round the works. In the course of a gracious word with an operative he asks a simple question in delightfully general terms. After a frantic search for any familiar clue our operative replies in highly circumstantial terms whose relevance escapes his chief. They part without having made contact. Factors affecting the value of a message are time (some decisions have to mature), degree of abstraction, the subtlety of the distinctions made, the weight accorded to it, the care with which criteria must be selected, and so on. For example, a scale of values based on abstraction would range from information that was highly 'speculative' (almost no data exists) through 'hybrid' (poor, disparate data) to 'precise' information (good relevant data).

Lest the art of management be thought of now as a mere branch of data processing it is instructive to reflect that good, relevant data are also available to competitors, since the more 'scientific' a fact is the more likely it is to be common property. Hence the decisions that pay off are those made before the data strictly justifies them. Indeed it is a common experience in management that if it is quite obvious something should be done then it is probably already too late! Part of the fun in management comes from recognizing an emerging pattern by intuition and acting upon it. Information of that kind, if it achieves the right results, is beyond price.

The purpose of a system is to carry information to decision makers

A more detailed examination of system features is made elsewhere. The above statement is not remarkable as a blinding glimpse of the obvious but is useful as a criterion whereby actual systems may be judged. Often splendid systems are set up, the purpose of which may be obscured or forgotten. Sometimes they suffer from a well-known design fault, having been selected for their form rather than for the use to which they were to be put. As the basic requirement changes, effort is expended on up-dating the form instead of satisfying the new demand. Even where this pitfall is avoided and the cost of the correct system is calculable its value may not be reckonable in comparable terms.

When the capacity of the system and its response time are dearly bought, the distinction between raw data and information has economic consequences. Examples are in-flight data-monitoring of measurements in a satellite, which is carried out in order to reduce the bandwidth of the telemetry system and the cost of subsequent data reduction; the writing of minutes at the time of a meeting rather than from the tape record; or the dissemination of unedited print-outs of works accounts to a wide clientele.

Decisions have to be made in widely varying time-frames. The form of the system should suit such variations. The unsuitability of currently available systems is very apparent during the early manufacture of a new, complex, product. In many, possibly widely separated, places, quite small parts of the product are being made. Despite all planning, difficulties are encountered; the drawings are wrong, operatives make mistakes, the little assemblies of parts fail their tests. The news of these mishaps is dull, the action needed to save each situation is often trivial, the decisions easily taken—if the facts are made known promptly and fully to the right man. The conventional solution to this problem has two well-known features: the regular progress meeting where trouble is reported and decisions are taken, and the appointment of numerous progress chasers and liaison engineers. This arrangement, which is usually agreed to be wasteful and ineffective, is wrong on several counts. Men are used as messengers where physical communications could help. The problems arise and the solutions emerge in different time-frames. In the worst kind of meeting, wriggling witnesses give variously coloured accounts of the little pieces of the action they are caught up in. The chairman gains the impression that he is burning while Rome fiddles.

The manager sits at a desk. Across the desk information in many forms flows back and forth. Not all decisions are made at short notice. Some involve speculation, discussion and the cultivation of opinion over many months. It is difficult to make certain that the contents of an in-tray get the attention they deserve when a telegram rubs shoulders with a highly technical account of a year's research.

A business system is the logical configuration of the significant elements in a selected problem area

This is much more the definition of a system *per se* than just its management aspect. Like other definitions, when examined in isolation it seems a tedious tautology. Its real value is in unmasking trumpery substitutes for good practice. Let us define our terms. *Logical* implies that a conscious attempt has been made to provide an appropriate means. *Configuration of elements* implies that all the essential components are present—in the current jargon, the hardware: typewriters, printers, telephones, duplicators, computers, filing cabinets, sorters, tabulators, etc.; and the software: stationery, a special language, agreed routines and programmes. *Significant selection* implies that of all the possible entities, only that group which is worth organizing is made part of a common network. This kind of eclecticism is a management survival-skill. It is the same skill which chooses the correct compromise between man and machine in an automation scheme. *Problem*: to have classified a question as a problem implies that it will be considered within a logical framework. In management, a particular advantage of this gambit is that comparison can be made with other, possibly already answered, questions and that division of labour is feasible since special-problem departments will grow up.

What does a manager do?

The manager adjusts the entropy of the organization. The patterns of demands and resources are not simply complementary. Only in the most unhelpful statistical sense is the strength of the workforce matched to the workload. Apart from this there is an exchange of goods, information or service with other parts of the organization. We shall concentrate on the properties of the information networks that he belongs to.

Communications

If we were to trace the flow of information in an enterprise, a very complicated description would be necessary. For discussion purposes I have simplified the situation somewhat. The main features are network structure, message characteristics, transit time and the transfer characteristics.

Network Structure

Each individual is a member of more than one different group. An office, a department, a committee, a works, a professional association may all make demands upon the same man. The total number of communication links is the aggregrate of all the selections that can be made by taking various pairs of correspondents from within and between the groups. Ranked by size alone, the links between the groups have characteristic traffic laws which strongly influence information flow and ultimately decision taking. Among the networks commonly used within a firm, mention should be made of the internal post, telephone, public address, the blackboard, the grapevine and the personal messenger. Problems often arise because messages are borne by alternative routes and opinion is created not only by the messages but by the discrepancies between them. It is difficult, for example, to guarantee that an explanatory talk and a formal statement convey precisely the same impression. There is also the well-known difficulty of arranging a meeting on a date mutually acceptable to several people when they are connected in different networks.

Message characteristics

The *form* of the message is closely related to the kind of network structure involved. Letters, minutes and ballot papers are forms suited to particular groupings of correspondents. The *time* during which a message is alive will usually influence the choice of the means of communication. It is a very well organized company indeed that provides adequate means for every possible interchange of views from an alarm signal to a statement of policy. Many messages require an answer. If often seems that a wary authority constructs its messages so that making a response calls for great ingenuity. A further most distressing feature of an information network is the store which is set up to hold the messages after they have been read. The provision of information stores gives rise to many administrative difficulties. These are considered below.

Transit time

The time taken to put another man in possession of the information you now have is made up of delays in the transmission chain and delays in putting the message in a communicable form. When a reply is wanted there are further delays. The various media used oblige delays. It is also possible of course to exploit delay, for example by thinking in your bath, tape-recording in bed and sending the postman to work instead of yourself!

Transfer characteristic

Just as data must be refined and sifted to turn them into information, information itself may need conversion for the particular purposes of correspondents or to facilitate its assimilation as knowledge. Conversion may not alter the information at all, as in the case of replication or translation, or, essentially, as in abstraction. More radical changes are introduced by criticism, organization (which may change the emphasis) or transformation (which may even alter the meaning).

Information networks

I propose to consider three aspects of information networks: sources, users and stores.

Sources of information

Although the circumstances which generate information are extremely varied, the majority of sources are people who express what they observe or believe or calculate in statements which are meant to be understood by other people. The process of generation is rather like that imagined by Fred Hoyle in his idea of continuous creation. Throughout the entire body of the organization there are people or machines who are suddenly, sporadically possessed of little bits of knowledge which can be of use to others just as randomly distributed in space and time. Management's task is really rather simple. It is merely to put those who know in touch with those who need to know.

There are difficulties. Sometimes vital facts are in the hands of those who are unaware of their significance. It also takes a remarkably long time to reduce a piece of information to a communicable form. If there is any suspicion that the facts are not used there is no enthusiasm to transmit them. The reverse is also true—if the information you dig out steadily advances somebody else in his career, why not leave him to do his own excavation? No man cares to feel that his efforts are being needlessly duplicated; if you are not the only one who knows why should you bear the dull tidings?

Even discounting human frailty, what is the most conscientious employee to do when he finds himself the owner of a clear, significant statement and no obvious way of sharing it? Faced with these circumstances, the manager dreams of a vast electronic jerry-go-nimble that hears all, understands all and tells all. Some common systems inhibit the free supply of information into the network. Company rules may result in frustrations and delays. It may be ruled that all internal communications are typed. This means that a memorandum can be originated only while typists are on the premises. The working day for typists is gradually shortening while that for engineers and managers remains fairly constant. Effective communication therefore steadily worsens.

Users of information

All employees are users of information not only as individuals but as members of groups. They must all be accessible, preferably by all the means of communication. (As an aside it is amusing to reflect that in some companies it is the practice to limit the entries in the internal telephone directory and to restrict its circulation. In others every employee is named in the directory against a number where he can be contacted.)

Several difficulties arise here:

(*a*) If the material is classified, employees must receive it personally and sign a receipt, or an accredited representative must do so for them.
(*b*) There is a similar restriction on telephone messages.
(*c*) Certain consequent action may depend on whether a reply is likely within a certain time.
(*d*) The address and its appearance in the directory must keep pace with changes in the employee's location.
(*e*) If the user wishes to compare the message with a related message previously received, he must have a file of such messages.

Information stores

These are of two kinds, bounded and unbounded. Typical of the first kind are works of reference, encyclopaedias, directories. The second kind is exemplified by the contents of a filing cabinet and of its separate files. There are several common features:

(*a*) the information must be readily indexable (because the indexing will be done by relatively unskilled personnel).
(*b*) the format should facilitate filing.
(*c*) the information should be *permanently* filed.
(*d*) the information should be readily retrievable.
(*e*) if 'classified', the information should be secured as necessary.

(*f*) 'question and answer' type messages should be easily identified and related.
(*g*) the store must have a custodian.

If the company remains in business for a reasonable time and is successful in its work, the unbounded store of information ought to become a very valuable property. Strangely enough this does not happen, for several reasons:

(*a*) Rate of innovation is high and archives have only a historical value.
(*b*) The record is very incomplete and without complementing it with additional material it is difficult to apply it.
(*c*) The information tends, even when reasonably complete, to refer exclusively to the particular problem of interest at the time. Extra effort is needed to distil general wisdom from the mass of detail.
(*d*) It is very difficult to foresee, at the time a report is filed, what features will be considered valuable in a few years time. Certain significant details are thus irretrievable.

It is often suggested that unnecessary duplication of creative work can be avoided by adequate reporting and the maintenance of a properly indexed library of reports. Two observations may be made on this:

(*a*) Duplication may not be an entirely bad thing.
(*b*) The only reports that do any good are those which are read. Committal to a library condemns a report to obscurity.

Personal storage of information has an important side-effect; it enhances the prestige of the custodian. The mere possession of a filing cabinet is an outward sign of grace and favour. Control of its contents proves to be an irritating administration chore. Worse still, it is a key move in a well-known gambit. Get yourself on a committee; arrange to receive its dreary classified minutes; requisition a cabinet to keep them in; borrow a girl to 'look after the filing'—empires have been built on less.

In recent years, a development in technical journal publishing has made an impact on the familiar filing cabinet. It is now common for large numbers of engineers to receive at work several controlled-circulation magazines every month. Some of these are of the highest quality and all tend to be retained by those who receive them. Unless something is done about it a company may find itself paying rent on space occupied by multiple copies of unsolicited information.

An attitude to information

What constitutes information is decided by men who know what are the objectives of the enterprise. What is processed is, in most cases, data for which machines are very suitable. Computers have revolutionised systemic communication, not only between people but between ourselves and machines. The ability to exchange information with a machine changes simple mechanization into automation. The feasibility of delegating to an automator functions which at one time were thought to be essentially human has stimulated fresh thinking about the respective roles of man and machine in the world of work.

It is inevitable that much of this thinking mixes anthropomorphic and mechanistic concepts and descriptions. The machines are alleged to 'read' tapes 'fed' to them. Instructions are given in a 'language' which is at once convenient for human use yet has a strictly limited semantic content. The machine makes 'decisions' according to rules of symbolic logic. Although it lacks 'intuition' and has a poor degree of 'associativeness' it makes up for these by being utterly faithful to its code and virtually tireless.

Just as the minds of human beings are developed by contact with other minds, the stilted dialogue between man and machine affects both. On the one hand, the man's natural behaviour leads him to exploit, or even redesign, the machine so as to reduce the tedium of his labour. On the other hand, the rather crass ability of the machine forces the man to analyse activity into simpler and simpler steps and to recognize machine-compatible processes in human thinking.

The chief 'languages' for carrying information are words, graphics, mathematics and codes. Among the latter there are several synthetic languages adapted to business use such as: General Organization Analysis Language (GOAL); Fully Automatic Compiling Technique (FACT); Common Business Oriented Language (COBOL); Tabular Systems Oriented Language (TABSOL); Program Evaluation Review Technique (PERT).

Machines can be instructed in these languages and can also report on the condition they find themselves in. A well-compiled phrase book in system language provides the best division of labour between man and machine in the following way:

Man	*Machine*
Proceeds heuristically	Obeys instructions literally
Invents ingenious routines	Checks compatibility of instructions
Shows great resource in meeting unforeseen circumstances	Always consults relevant criteria
Can fix the machine	Always resolves an ambiguity the same way
	Never tires
	Keeps books meticulously
	Does arithmetic well

The future?

If management could free itself from the fatiguing and frustrating chores of information processing it could devote more time to three tasks which are at the moment sadly neglected.

(1) Writing the 'operating manual' of the company and finding opportunities to keep it up to date.

(2) Cultivating the art and science of forecasting.

(3) Keeping the workforce informed on company policy and objectives.

There are also two inventions which would go a long way to improving information flow:

(*a*) A telephone which would accept and record messages when the correspondent was engaged or absent.

(*b*) Replicating ink which would fade suddenly after three months, leaving the poorly organised custodian with a cabinet full of blank paper!

Letter to the Editor

NON-STANDARD MATERIALS AT THE NLL

Dear Sir,

May I be allowed to make two comments on the interesting and helpful paper by K. P. Barr published in the August *Proceedings*?

Mr Barr explains the difficulties of arranging conference proceedings by title. When NLL began to function Dr Urquhart made a great song and dance about his revolutionary methods of shelving all works by title; had he been able to overcome his aversion to qualified librarians he might have learned earlier that the revolution would not be without its problems!

My other point concerns 'hard copy' USAEC reports, by which I take it that Mr Barr means printed reports. Mr Barr says that USAEC ceased to issue these in July 1964, but I received a letter from the Commission in April of this year stating that they would not be issued after July 1965.

Yours faithfully,
K. G. B. BAKEWELL.

9 Greenacre Road,
Woolton,
Liverpool 25
4th September 1965

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Volume 17 **November 1965** **Number 11**

ASLIB CALENDAR 1965

November

THUR.25 – FRI.26.	Course on the Trade Literature Collection.
MON.29.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Convincing our customers of the importance of information services', by J. H. Mackay-Whitton (Tack Organization, Ltd).
TUE.30.	Chemical Group meeting. 'Mechanical handling of chemical information', by E. Hyde, ICI Pharmaceuticals Division.

December

THUR.2.	Electronics Group meeting at Aslib. 'The indexing habits of engineers and scientists', by R. D. Kerr-Waller, Telecommunications Laboratories Ltd. See paragraph below.
TUE.14 – FRI.17.	Repeat of Junior Introductory Course to Special Library and Information Work. See paragraph below.
WED.22.	Christmas cocktail party at Aslib.

1966

January

THUR.27.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Local co-operation—a positive force', by H. A. Chesshyre. See paragraph below.

February

WED.16.	Midlands Branch meeting, Coventry.

March

FRI.18.	Scottish Branch annual general meeting, East Kilbride.
TUE.22.	Midlands Branch annual general meeting, Birmingham.

September

SUN.25 – WED.28.	40th Annual Conference at Scheveningen (Netherlands).

Evening Meeting

On Thursday 27th January 1966 under the title 'Local co-operation—a positive force', Mr H. A. Chesshyre, Senior Tutor Librarian at Hatfield College of Technology, will consider what, in his view, constitutes an ideal scheme for local co-operation in the exchange of library materials and information. He will follow this by making a practical evaluation of the existing schemes in contrast to the ideal, and will put forward suggestions for possible future development. The meeting will then be open to general discussion. Mr Jack Burkett, Senior Lecturer, School of Librarianship, Ealing College of Technology, will take the chair.

Junior Introductory Course

The Junior Introductory Course to Special Library and Information Work held from 26th to 29th October was heavily overbooked, and the course is consequently being repeated from 14th to 17th December. So many had to be refused admission to the October session that it is doubtful if there will be places for any others. Any students who wish to attend the new session, and who did not apply to attend the October session, should contact the Education Officer *after 30th November* to inquire if there are any places available. The next session of this course will probably be held in March.

Aslib Annual Conference

The thirty-ninth annual conference of Aslib was held this year at the University of Keele from Wednesday 29th September to Friday 1st October. Attendance was good; original bookings numbered 411, of which some twenty were cancelled.

There was a full programme of lectures, beginning with an informal session on 'The exhilaration of information work'. While this session was rather too informal for publication here, it is intended that all other papers will be published in *Aslib Proceedings,* with the exception of that by Dr Coblans on 'The use of mechanized methods in information', the substance of which will eventually be included in a separate publication. Other activities included a civic welcome by the Lord Mayor of Stoke-on-Trent, a slide lecture on the Potteries by Professor S. H. Beaver, an afternoon for excursions and an impromptu concert. The exhibition of recently published scientific and technical books by the Publishers' Association was greatly appreciated.

We should also like to express our gratitude to members of the Conference Committee, including Dr Dodd of BCRA and Mr Stewart, the University Librarian.

It is also worthy of note that with this conference, Mrs Anne Elphick, the Meetings Organizer, completes twenty years of organizing conferences and meetings at Aslib.

Guide to Foreign Languages

The third edition of the *Guide to foreign languages for science librarians and bibliographers,* compiled by J. R. F. Piette, revised and enlarged by Mrs E. Horzelska, is now published by Aslib. The book gives practical guidance on the identification, transliteration and typographical peculiarities of twenty-eight languages, mainly European, together with notes on proper names and a useful vocabulary for each language. The price is 21*s* to members of Aslib, 27*s* 6*d* to non-members. Orders should be sent to the Sales Department, Aslib.

Photocopying and copyright

A guide for librarians, teachers and all who supply and use photocopies of copyright works has been prepared jointly by the Society of Authors and the Publishers' Association. The guide, entitled *Photocopying and the law,* summarizes in eight pages the current legal position and defines the attitudes of the issuing bodies in matters which the law itself does not cover. Copies of this pamphlet are available, price 1*s*, from the Publishers' Association, 19 Bedford Square, London WC1.

Electronics Group

The winter meeting of the Aslib Electronics Group will be held at 5 p.m. on Thursday 2nd December at 3 Belgrave Square. Mr R. D. Kerr-Waller, head of information retrieval projects at Telecommunications Laboratories Ltd, will present a paper on 'The indexing habits of engineers and scientists', which will be followed by a discussion.

The meeting will be combined with a sherry party, the second to be held by the Group following a very successful one early this year.

Those who wish to attend should send applications and the charge of 7*s* 6*d* (cheques payable to Aslib Electronics Group) to Mr K. J. Spencer, Librarian, Ministry of Aviation Central Library, St Giles Court, St Giles High Street, London WC2, by Tuesday 16th November.

Classes in Palaeography

The School of Librarianship at North-Western Polytechnic runs a January–December course for its full-time and part-time students leading to Paper B92 of the Library Association's examination. Since this class is likely to be very small, the School is willing to take a few extra students (who need not enter for the examination). In the main, the course consists of practice in transcription, and students should have a good knowledge of Latin. The fee for a year's classes, held on Wednesday evenings from 5.30 to 7.30 p.m., is 48*s* (plus 2*s* student membership fee). Applications for the course beginning in January 1966 should be sent as soon as possible to Mr P. G. New, School of Librarianship, North-Western Polytechnic, Prince of Wales Road, London NW5.

Indexing course

A four-day course in indexing sponsored by the Society of Indexers and the School of Librarianship, North-Western Polytechnic, will be held at the school from Tuesday 25th to Friday 28th January 1966. Fees are 30*s* for the whole course or 5*s* for individual lectures. Further details and application forms may be obtained from Mr P. G. New, School of Librarianship, North-Western Polytechnic, Prince of Wales Road, London NW5.

Belfast School of Library Studies

The new School of Library Studies at Queen's University of Belfast admits its first students, some thirty-five, mainly from Northern Ireland, this term. The School has been established with the aid of a generous grant from the Leverhulme Trust, and offers full-time courses of one year for university graduates and two years for non-graduates. Both courses lead to the award of the University's Diploma in Library Studies, which has been accepted by the Library Association as equivalent to its own professional examinations. Diplomates will thus be eligible, after a period of approved service in a library, for admission to the Register of Chartered Librarians. The new school is the fourth to be established at a British university, the others being at University College, London, the University of Sheffield, and the University of Strathclyde: only the Belfast school admits both graduates and non-graduates to a Diploma course.

The Director, Mr P. Havard-Williams, M.A., A.L.A., A.N.Z.L.A., the University Librarian, will be assisted by a full-time teaching staff of three and by practising librarians acting as part-time tutors.

The address of the School is 2 College Gardens, Belfast 9.

Leeds School of Librarianship

Librarians seeking staff are asked to note that the courses at Leeds School of Librarianship end in December each year. Although September is probably the principal month in which new entrants are recruited to libraries, the School is less able to refer students to posts at this time. A great deal of information was received on posts vacant during June and July, but comparatively little during the autumn. Closing dates often pre-dated the students' return in September.

The School would like to hear of posts previously notified which are still vacant; they would also prefer more comprehensive information than is commonly found in advertisements, including such details as the size, staffing and location of libraries and information on the responsibilities and duties of the librarian to be appointed.

Chicago Scholarships

The University of Chicago Graduate Library School will offer approximately fifteen scholarships and fellowships for 1966–7, in amounts up to $4,000. In addition six predoctoral and two postdoctoral training stipends ($2,400 and $6,500, respectively, over tuition) for medical librarianship will become available in the near future. Application deadline for scholarships and fellowships is 1st February 1966. A number of research assistantships will also be offered; these are on a half-time (twenty hours per week) basis and are compensated at an hourly rate depending on the qualifications of the student. Applications for the latter will be considered at all times during the year. Address inquiries to: Dean, Graduate Library School, University of Chicago, 1116 East 59th Street, Chicago, Illinois 60637, U.S.A.

Co-operation at Hillingdon

Two informal meetings have been held at which librarians employed in the new London Borough of Hillingdon discussed methods of mutual help and the possibilities of a formal scheme for co-operation between libraries in the Borough. Apart from the public library and the libraries of several firms and organizations the Borough will include the libraries of Uxbridge Technical College and Brunel University.

Any librarians employed in the Borough of Hillingdon who did not attend but who would like to be invited to any future meetings should contact Mr Philip Colehan, F.L.A., Borough Librarian, Drayton Hall, West Drayton. (West Drayton 2275.)

THE INFORMATION REQUIREMENTS OF INDUSTRIAL MARKETING RESEARCH

IAN MACLEAN, M.A.
Market Research Manager, Air Products Ltd

[*Secretary of IMRA*]

Paper presented at Aslib Annual Conference, 29th September 1967

MARKETING Research is probably most widely known to the public through the activities of attractive young ladies who stop you in the streets to ask a whole series of apparently disconnected questions. How many cars do you run? When did you last beat your wife? Can you tell margarine from butter, or Wilson from Heath?

The value of marketing research for consumer products has been recognized for a long time. This is the result largely of three factors. There is a large number of customers, the manufacturer is often several stages away from his market and a large expenditure is required for advertising.

Industrial marketing research has developed more recently than research for consumer products, as the manufacturer of industrial goods has not been subject to quite the same pressures. He is generally closer to his market, his relationship with customers tends to be more direct and the number of industrial companies is relatively small. Several factors have, however, in the post-war period coincided to encourage the growth of marketing research as a specialist function:

a The increasing rate of technological change
b The growth in the size of companies
c Increasing management mobility.

These factors are tending to make it increasingly difficult for the management of large or even medium-sized industrial companies to keep in close touch with the market without recourse to specialist services such as marketing research. The increasing rate of technical change tends to give products a much shorter life and to widen the opportunities open to a company. The growth in the size of companies means that policy decisions are often taken by management no longer in direct touch with the market, and the increased mobility of management has led to the situation in which there are many men in top management positions with relatively short experience of the products and markets of their firm. Gone are the days when an executive spent his working life with the same company. The importance of these trends was obscured for the first ten years or so following the end of the war as most industrial goods were in short supply, and products were allocated to customers rather than sold. Since the mid 1950's, however, supply has tended to outrun demand with a consequent increase in competitive pressures. Management has been forced to sell more and more aggressively in its existing markets, to look for new markets and opportunities for diversification in new product fields. These conditions are naturally favourable to marketing research and it is not surprising that the last ten years have seen a very substantial increase in its rate of growth. Ten years ago it would have been possible to collect all the people in the United Kingdom engaged in industrial marketing research into a small room. By a process of what in retrospect seems almost spontaneous generation, industrial marketing research groups came into existence in Manchester, Birmingham, the North East, and London, and another was formed for the chemical industry. The regional groups formed the Industrial Marketing Research Association in 1963. Combined membership was then just over 100. The figure is now 600 and growing rapidly. This trend is not restricted to the United Kingdom (the USA as usual is well ahead). A similar development is taking place in Europe. In fact it has recently been possible to form a European Association for Industrial Marketing Research which should have its first international conference in 1966.

The scope for industrial marketing research is perhaps best illustrated by reference to the volume of trade between industrial companies—approximately £40,000 million a year. To this can be added another £4,000 million for capital investment and another £4,000 million in supplies to the government. The total value of business transacted by industrial companies in this country, therefore, is in the order of £50,000 million a year. By comparison the expenditure on consumer goods and services is in the region of £20,000 million a year, of which about £3,000 million consists of government tax. From the point of view of a supplier the industrial market is approximately three times the size of the consumer goods market. A rough calculation shows present expenditure on industrial marketing research as a specialist function to be in the region of £3 million a year, or 0.006 per cent of the turnover of industrial companies. The chemical industry has taken the lead in developing the use of industrial marketing research.

A definition of industrial marketing research

In order to define industrial marketing research it is perhaps necessary first to decide what we mean by marketing. The best definition that I have met is one devised by Don Miller, the Marketing Vice-President of the B. F. Goodrich company in America, 'Marketing is the process of defining, anticipating and creating customer needs and wants, and of organizing all the resources of the company to satisfy them at greatest total profit to the company and to the customer.'

The definition of industrial marketing research now follows logically. It is the process of investigating the present and future requirements of the market, systematically analysing the results and presenting the information to management in such a form that decisions about the marketing policy of the company can be based on it. These decisions fall broadly into two areas. Improving the

DEPARTMENTAL PATTERN OF WORK

Specific functions covered by departmental IMR work, according to regularity of performance:

	Of which:	TOTAL	*Regular*	*Occasional*	*Rare*
		%			
Sales Forecasting	—for Sales Budgets	58	44	7	7
	—of Market demand/development	89	60	26	3
	—of product ,, ,,	83	56	24	3
Other Forecasting	—of general business/economic forecasting	69	30	28	11
	—of material availability	26	4	6	16
	—of labour requirements	20	5	2	13
Competitive position of company products		83	48	32	3
Analysis of market size		94	70	23	1
Studying trends in market size		88	61	23	4
Analysis of territorial potential		61	25	26	10
Setting sales quotas		31	15	6	10
Determining characteristics of markets		80	43	30	7
Estimating demand for new products		79	51	44	4
Measuring variations in territorial yield		35	15	8	12
Customer acceptance of proposed new products		61	24	27	10
Measuring salesmen's effectiveness		30	10	10	10
Comparative studies of competitive products		61	23	29	9
Analysis of salesmen's activities		33	10	11	12
Competitive pricing studies		56	18	28	10
Evaluating competitive product developments		48	18	20	10

Studying economic factors affecting sales volume		67	38	19	10
Sales remuneration		16	2	5	9
Advertising and selling practices of competitors		49	15	18	16
Evaluating proposed new products or services		56	30	19	7
Establishing or revising sales territories		32	6	14	12
Advertising effectiveness		31	9	12	10
Selection of advertising media		23	4	12	7
Determining present uses of existing products		69	41	23	5
Price studies		48	22	17	9
Evaluating present sales methods		29	4	15	10
Development of salesmen's standards		19	3	4	12
Distribution-cost studies		25	4	10	11
Studying shifts in market composition		53	22	21	10
Studying relative market profitability		42	10	22	10
Seeking new uses of present products		57	25	19	13
Determining sources of customer dissatisfaction		31	16	10	5
Changes in customer-type importance		34	10	15	9
Market tests or test market activities		28	7	11	10
Appraising proposed sales methods		21	1	10	10
Packaging research		18	3	5	10
Product line simplification and completeness		26	8	8	10
Effectiveness of promotional devices		24	4	10	10
Motivational or qualitative research		20	4	10	6
Development of research techniques	*	43	16	16	11

(Base = 105 Q's except "*" = 79 Q's only)

From 'A Survey of Company Industrial Market Research 1964' by Dr Frank Pearce of W. T. Avery Ltd.

present performance of the company by ensuring that the resources of the company are employed in such a way that they fit accurately into the pattern of the market, and planning the future lines of development of the company and its capital investment—what products should be dropped, what products should be developed, and where, how and in what quantities should they be sold.

It should be stressed that industrial marketing research is only an aid to management decision making, a method of reducing the area of risk involved by improving the information available. The type of work carried out by market research departments varies widely. Broadly speaking the major activities are forecasting new product studies, and investigations of market share. In a recent survey of industrial marketing research practice in the United Kingdom, Dr Frank Pearce of W. T. Avery Limited gives a list of the specific functions carried out by marketing research departments. These functions are set out in the table on pages 310 and 311.

Information requirements of a marketing survey

The information required from a survey will vary widely depending on the decision to be made. In considering capital investment the main requirement is a forecast of total market size and company share, whereas in the planning of sales territories it is the existing geographical potential that is the main criteria. It is possible, however, to describe what one might call a standard survey. This would include the following points:

a Market size
b Market structure
c Market trends
d Market share
e Names and details of companies.

Market size

This is not as straightforward as it might seem, as it is necessary to define accurately the market the company is concerned with. There is not, for instance, one market for motor cars, but a market for sports cars, family saloons, cheap and expensive cars, a market for large and small cars, and each of these can be further sub-divided. The market for electric motors varies widely between the fractional horse-power motor used in domestic appliances and the enormous electric motors used to drive the rolling mills at a steel works.

Market structure

There are several different ways of dividing up a market, all of which have an important bearing on the marketing policy of the company. The main sectors are by geographical area, by industry and by size of customer.

The importance of a geographical breakdown is obvious for the location of factories and depots and the distribution of the sales force. The industrial pattern is important as industries tend to have different characteristics, and the size of customer analysis is of prime importance to the ultimate profitability of the venture. In most markets a small number of customers accounts for a large proportion of the total business. It is often asserted that 80 per cent of sales arise from 20 per cent of the customers. As it requires a different type of sales promotion, salesmen and distribution facilities to sell to the various sizes of customer, it is essential that a marketing plan should take into consideration the size distribution of its customers and so organize its resources that they are concentrated on the particular sector of the market at which it has been decided to aim. A not unimportant feature of small customers is that as invoicing costs are the same for large and small customers many small customers are probably being handled at a loss.

Market trends

We may define two broad areas. Natural growth and substitution. By natural growth I mean the growth of industries to which a product is supplied. By substitution I mean the extent to which the product is taking over the market of other products for the same application or is itself being attacked. For instance, the replacement of steel by plastics, or rail transport by road transport.

To build up the future demand pattern it is essential to analyse the demand in terms of the industries to which the product is sold, as these industries are growing at a different rate. If one can weight these industries according to their importance one can then get a very much clearer indication of the future demand for the product.

To assess fully the importance of techno-economic forces it is important that the market for the product should be analysed in terms of applications to which the product is put, as a product frequently has several applications and its vulnerability varies between these different applications. For instance acetylene is used for cutting and welding, and for the last ten years has been under competition from propane, but as propane cannot be used for welding this part of the acetylene market remains inviolate.

Factors affecting market share

With the exception of monoplies the critical element in most companies' profitability is the share of the market it holds and the cost it has had to incur in order to achieve that share. The factors influencing market share are many and varied as the following list shows:

Rate of resigning of old accounts
Rate of growth of existing accounts
Rate of signing of new customers
Factors affecting resigning:
  Price policy
  Service record
Factors affecting new signings:
  Prime policy
  Number and type of salesmen
  Call rate
  Effectiveness of calls
  Delivery dates

Factors affecting call effectiveness:
  Attitude of customers to the company
  Indirect sales programme
Factors affecting customer attitudes:
  Price
  Quality
  Service
  Continuity of supply
  Technical co-operation
  Full line purchasing policy
    Products
    Geographical factors
  Impact of advertising, etc.
Factors affecting indirect sales programme:
  Method
  Rate of expenditure
Factors affecting method:
  Message to be put across
  People to be aimed at
  Choice of medium

Competitors' activity

If a company is setting out to obtain a given share of the market at the lowest possible cost, it is essential that it should be aware of the importance of each of these factors and of the effect of varying such inputs as expenditure on promotion, number of salesmen, etc. This information requires a considerable research effort if it is to be provided accurately and in the detail required for decision making.

Companies

Eventually all sales must be to individual companies, so it is naturally important to be able to identify firms by name. This applies not only, of course, to customers and potential customers but also to competitors.

The methods employed to obtain information for industrial marketing research

The most useful classification is probably between primary and secondary information, primary data being that derived at first hand, secondary information being derived largely from published sources.

There are three ways of obtaining primary information:

a Personal visits
b Telephone interviews
c Postal questionnaires.

Field work in the form of visits is relatively expensive, the average cost of an interview being five pounds, but there are obvious advantages of talking face to face with the respondent. The postal questionnaire has the advantage of cheapness, but is restricted in the questions that can be asked, and it is difficult to check the accuracy of the answers. The average response rate to postal questionnaires is in the region of 20 per cent. The telephone interview is more expensive than the postal questionnaire, but considerably cheaper than personal visits. It has the advantage of direct contact with the informant, but there is a restriction in the number of questions that can be asked, and it is sometimes difficult to judge the extent to which genuine answers are being given. With regard to the secondary sources (the published information) the following quotation from an anonymous journalist in one of the daily papers seems to me to sum up one of the main problems. 'If mankind dodges nuclear cremation, the problem won't be reconstructing twentieth century anthropology from shambolic great slagheaps of paper, film, acetate, and plastic upon which we now narcissistically imprint our speech, thoughts and actions. Ours is a crapulently over-documented age. Everything goes on the record. Any dreary government department owns warrens stacked with mimeographed silt. Every official drones imperishable twaddle into dictaphones. Cosmic miles of television drivel are preserved on stored spools.' Arnold Toynbee once told me, 'The nineteenth century criterion of going back to original sources is obsolete. Now a historian needs a motor cycle to get around the warehouses of files.'

Perhaps it is a sign of the times that the paper I recently gave to the Industrial Marketing Research Association was entitled 'A Guide to the Guides of Sources of Information for Industrial Marketing Research'. In this paper I do not want to discuss the sources of published information in detail but rather to describe the use made of them in industrial marketing research.

Field Work

There are three main stages:

a Determining the firms to be visited
b Preparing the questionnaire
c Carrying out the interview.

It is only from published sources that one can derive the basic framework of a company by size, industry and geographical area that is required in order to plan the number and type of visits required, and when names have to be put to the companies, directories are essential. The task of marketing research has been made much easier in this respect by a very valuable publication, the CBD *Directory of Directories,* for which, as you know, George Henderson is responsible.

Preparing the questionnaire is one of the most difficult tasks in field work, as it is not easy to ensure that the questions are both comprehensive and unambiguous. And it is essential that the market analyst should build up an understanding of the market. Most market analysts range widely across markets and products in the course of relatively few years, and, as you know, it is difficult to be an expert in everything. My own experience has ranged from steam turbines to rubber gloves, aluminium tubes to sulphur hexafloride, prefabricated buildings to vending machines. This list is not exhaustive or unusual. The required background information is derived partly from talking to experienced people in the company, but 'reading oneself in from published information' is an essential process. In this context I would like to mention how valuable I have found the *British Technology Index*.

Carrying out the interviews

Sending an inexperienced, badly prepared interviewer on visits is not only disastrous for the survey but also tarnishes the reputation of the company and of marketing research. Incidentally, if you have heard reports that some of those down-to-earth, call-a-spade-a-bloody-shovel northern businessmen have eaten some of the young interviewers sent to see them, they are true. The well-briefed interviewer will get the full value from the visit. Again published information provides much of the background information required.

Conclusion

Industrial marketing research is one of the many forms of information gathering that provides management with the data on which to base its decisions. It is not the function of marketing research to make management decisions but rather, by carefully collecting and analysing relevant facts about the market, to present the management with an indication of the likely trends in the market and the present position of the market. To carry out this work certain techniques have been developed, but they are still in their infancy. The next decade should see a considerable extension and improvement of these techniques.

I have been impressed by the advanced methods and sophisticated techniques used by information scientists, but from my own limited experience I sometimes wonder if your basic love of books, indexing, classifying and retrieval systems is not leading you into a position where the cart is in front of the proverbial horse. I would be among the last to challenge the importance of good techniques, but I doubt if anything like enough use is made by management of the vast flow of published information. Management may be largely to blame in that it doesn't ask for the data, but often this is due to the fact that it doesn't know what is available, or has not the time to read it in the form in which it is available. Your speciality is to know what information is available, and it is up to you to make management aware of this vast storehouse of data, and to present it in a form in which it can be assimilated. Management knows what information it needs to run its business. You know what information is available from published sources, so there ought to be a two-way flow. I have already mentioned two examples, on the general level, where this approach seems to have been used—the *British Technology Index* and the *Directory of Directories*. In another field the abstracts prepared by the Rubber and Plastics Research Association are a good model. I know that many companies have extremely good bulletins, but one still has the feeling that this is an area in which communication is not as good as it might be.

In conclusion, if I might borrow from Swift's famous quotation from *Gulliver's Travels* and bend it to my subject, 'If you can help to carry out two market surveys in the time previously required for one, you will do more to improve the efficiency of British industrial marketing than the whole race of politicians put together.'

DISCUSSION

Mr J. J. Eyre (G. A. Harvey Group Services Ltd) asked whether in an industrial market research survey the same person should do both desk work and field survey or whether one person should digest the published information and another decide whether or not a full survey would be of value.

Mr Maclean replied that this would depend on the organization of the particular company. Field work was expensive and would not be undertaken if the problem could be answered satisfactorily by desk work. If both were essential in a study, they should preferably be done by the same person or much background information would be wasted.

Mr C. Bleasdale (F. W. Berk & Co. Ltd) asked whether the size of the IMR department could be related to any factor such as turnover.

Mr Maclean replied that most market research departments consisted of four or five people and that size had no relation to turnover. The chemical industry was well ahead of any other in the use of IMR. Engineering had been slow to apply it. In reply to a further question as to whether those companies using market research were the most successful in their fields, he maintained that success depended rather on good management and on being in close touch with markets.

Mr A. J. Dickson (Ealing Technical College) asked which department industrial market research should come under; he remarked that the desk work appeared to be done by the IMR worker and wondered what training the librarian might undertake to enable him to assume a less passive role.

Mr Maclean said that the position of IMR in the company depended on the way its use had developed there and varied from one company to another. On the whole, he thought it better that it should not come under the sales side, as much of the work consisted of establishing targets for sales. He felt that the librarian was bound to be limited to producing information when asked. The situation would be rather different in companies where there was no MR department and the librarian had greater responsibility. It was, however, difficult to train someone in market research.

Mr V. I. Biske (Lobitos Oilfields Ltd) objected to unexpected telephone calls from a market researcher and recommended that a preliminary letter be sent asking if one would be prepared to answer questions by telephone and what would be the most convenient time for such a call.

Mr C. W. Hanson (Aslib) asked whether information collected in surveys was stored and, if so, whether it was available for consultation by other research workers. Much of the material must have importance outside commerce.

Mr Maclean thought that once the information had served the purpose for which it was collected it was not kept, although it might be used in a follow-up survey. The Industrial Market Research Association (IMRA) was establishing a system for collecting such information and making it available to members.

Mr R. N. Beer (British Hydrocarbon Chemicals Ltd) asked how market researchers were trained in the UK, the USA and on the Continent.

Mr Maclean said that he had no experience of the USA or the Continent but thought it was much the same as in the UK—there was no training. IMRA was now turning its attention to training and had organized three courses to give people the elementary knowledge required to carry out field surveys. There was only one textbook on the subject, and that was of relatively recent origin. A bibliography of articles on IMR would appear this year.

Mr E. D. Wiggins (Fisons Ltd) said that the speaker had, by inference, relegated the information officer to a mere storer and retriever of data, while all the intellectual work was 'creamed off' by the ('untrained') market research worker. What status did Mr Maclean accord the information worker?

Mr Maclean stressed the importance, in the industrial market, of being in close touch with the company to see exactly what the problems were. He had already emphasized the importance of published information. . . . *Perhaps* the information officer *could* take the place of the IMR man, but the tendency was in the opposite direction.

Mr C. E. C. Hewetson (H. J. Heinz & Co. Ltd) asked whether the information department referred to was part of the marketing side or whether it served the company as a whole. What prevented a general industrial information service, particularly one allied to research, from providing the information needed by the market researcher? He felt they had reached an impasse. The market researcher did not come to the information officer and the latter did not go to the market researcher. Could one not do better by using the normal systems operating in a company?

Mr Maclean considered that most information services had a strong technical and scientific bias. The commercial side had been added later on.

Mrs K. Bourton (Constructors John Brown Ltd) outlined the method used in her company to provide a weekly information bulletin and an annual report. She felt that market research work was very much the job of the information department. If management could be convinced of this, the battle was won. In reply to a question from a member, she said that at present her company did not use questionnaires, but relied on published information. They would, however, shortly be getting out a questionnaire.

Mr F. Liebesny (British Aluminium Co. Ltd) referred to the setting up of a marketing research department in his company, separate from the information department. After early consultation on the sources and services available in and from the information department, the marketing research staff went ahead independently for some time; it was soon realized, however, that their service was in many ways inferior to that previously obtainable from the information department and the marketing research department was therefore disbanded.

Mr P. Spiro (Institute of Bankers) asked what justification there was for describing IMR as a 'science'.

Mr Maclean maintained that any study that attempted to make use of scientific method was coming within the orbit of a science-based discipline. IMR was only ten years old, and had not yet developed sophisticated techniques. In the next fifty years, he considered there would be a considerable improvement in techniques and he referred to work done by Professor Katz of Chicago.

Mr R. Snel (Shell International) pointed out that in his organization few items of information came from published material, most being derived from the company's confidential files and the experience of its executives.

Mr A. E. A. Buyn (Koninklijke Nederlandsche Hoogovens en Staalfabrieken N.V.) pointed out that if there was an industrial marketing research department in the company, the task of the company librarian serving that department went far beyond producing specific items on request. The best education for such a task would be a knowledge of economics in relation to technology or *vice versa,* plus training in special librarianship and documentation.

Mrs Irene Veasey (Blackwell Ltd) felt there was an enormous amount of information potentially available from a firm's sales staff and asked to what extent salesmen were used in market research surveys.

Mr Maclean did not consider they were the right people to collect the information needed, though they might, on occasion, be asked to provide information on matters such as the payroll and type of company.

Mr A. L. Smyth (Manchester Commercial Reference Library) asked to what extent the market researcher relied on facts rather than opinions.

Mr Maclean said that basically they were dealing with facts; in assessing the situation opinion naturally played a part.

Mr J. J. Eyre (G. A. Harvey Group Services Ltd) said that his company used to get MR consultants to do surveys and had found that these consultants always preferred to collect their own information. The company had now decided to do its own surveys using the information service to do preliminary short reports to establish the desirability of a full survey. The information staff had been increased for this purpose.

Mr Maclean considered that consultants operated at something of a disadvantage in carrying out a survey since they were limited in time and costs. They therefore tended to cut out the desk survey, which might be time-consuming and fruitless, and go straight for the field survey.

SELECTIONS FROM THE RECENT LITERATURE

ALL ITEMS listed may be borrowed from the Aslib Library, except those marked *, which may be consulted in the Library.

Books and Pamphlets

AMERICAN INSTITUTE OF PHYSICS. Documentation Research Project
A review of work completed and in progress, 1961–1965, by Pauline Atherton. New York, the Institute, 1965. 10 p.

AMERICAN LIBRARY ASSOCIATION
Administration of the small public library, [by] Dorothy Sinclair. Chicago, the Association, 1965. ix, 173 p. $5.

AMERICAN LIBRARY ASSOCIATION. Library Administration Division. *Buildings and Equipment Section*
Planning library buildings for service: proceedings of a Library Buildings and Equipment Institute . . . July 6–8, 1961, Kent State University, Kent, Ohio; edited by Harold L. Roth. Chicago, the Association, 1964. 127 p. illus. $3.75.

BRITISH INSTITUTE OF MANAGEMENT
A bibliography on management subjects. London, the Institute, [1965]. 23 p. 2*s* 6*d*.

*CLASSIFICATION RESEARCH GROUP
A Classification of library science: preliminary draft edition. London, Aslib, 1965. ix, 33 p. mimeog.

COMPUTER AND INFORMATION SCIENCES SYMPOSIUM, Evanston, Ill., June 1963
Computer and information sciences: collected papers on learning, adaption and control in information systems, edited by Julius T. Tou and Richard H. Wilcox. Washington, D.C., Spartan Books (distr. London, Cleaver-Hume), 1964. vi, 544 p. diagrs.

GREAT BRITAIN. Board of Trade
The Board of Trade Statistics and Market Intelligence Library. London, [1965]. 10 p. gratis.

*GREAT BRITAIN. Department of Education and Science. *National Lending Library for Science and Technology*
Current serials received by the NLL March 1965. London, H.M.S.O., 1965. xii, 322 p. 27*s* 6*d*.

*GREAT BRITAIN. Patent Office
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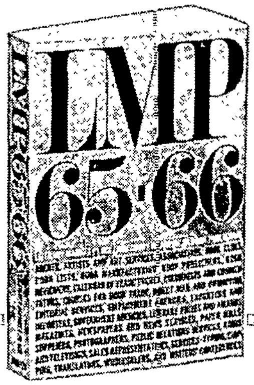

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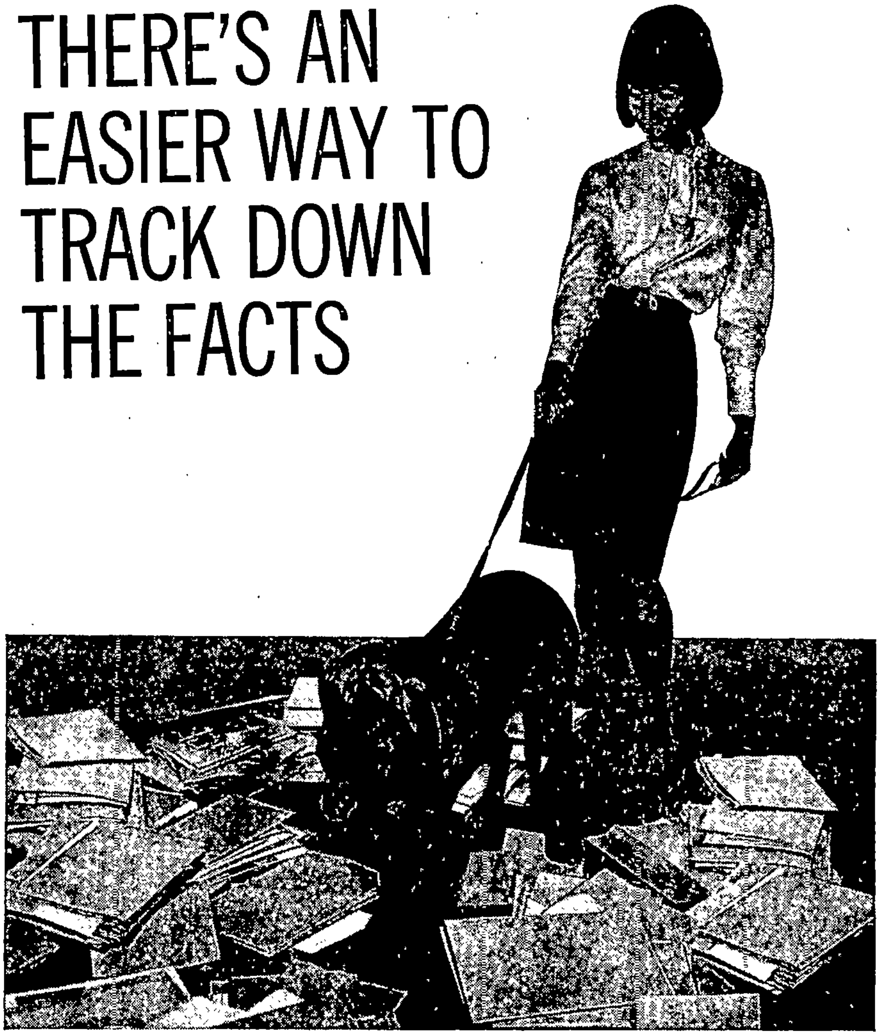

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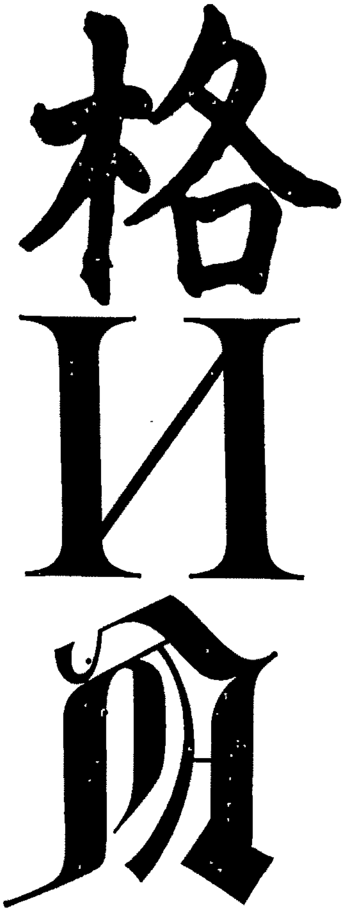

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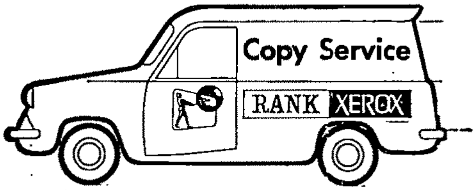

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ASLIB PROCEEDINGS

incorporating Aslib Information

Volume 17 **December 1965** **Number 12**

ASLIB CALENDAR 1966

January

THUR.27.	Evening meeting at Aslib, 5 for 5.30 p.m. 'Local co-operation—a positive force', by H. A. Chesshyre.

February

TUE.8 – WED.9.	Aslib Course on work with patents. See paragraph below.
WED.16.	Midlands Branch meeting, Coventry.
THUR.24.	Evening meeting at Aslib, 5 for 5.30 p.m., on Shell photographic library. (Details next issue.)

March

FRI.18.	Scottish Branch annual general meeting, East Kilbride.
TUE.22.	Midlands Branch annual general meeting, Birmingham.
WED.23.	Northern Branch annual general meeting. Sheffield University.
FRI.25 – SUN.27.	Aeronautical Group 15th Annual Conference, College of Aeronautics, Cranfield. See paragraph below.

May

THUR.5 – SAT.7.	Midland and Northern Branches. Joint conference at Llandudno.
WED.18.	Electronics Group visit to Signals Research and Development Establishment.

June

FRI.24 – SUN.26.	Electronics Group 8th annual conference, Ashridge House, Berkhamsted.

September

SUN.25 – WED.28.	40th Annual Conference at Scheveningen (Netherlands).

Aeronautical Group

The 15th annual conference of the Aslib Aeronautical Group is to be held on Friday 25th to Sunday 27th March 1966, at the College of Aeronautics, Cranfield. A session which should provoke discussion is on 'Saving time in the library'. At this, speakers will present short papers on the pros and cons of such topics as periodical circulation, abstracts versus title-listing, and printed indexes versus catalogue cards; discussion will follow. The technical paper will be on 'Wind tunnels' and will be given by Mr R. Hills, Chief Executive of the Aircraft Research Association Ltd. A historical paper will be presented by Air Comm. A. Wheeler, and a paper entitled 'Make your own thesaurus' by Mr Stevens of the Ministry of Defence, Navy Department, NSTIC. More information will be given later and application forms will be sent to members of the Aeronautical Group. Others who wish to attend should apply to Mr E. J. MacAdam, 74 Stancliffe Road, Bedford.

Aslib Co-ordinate Indexing Group

The first meeting of this Group will be held at Aslib on 12th January 1966 starting at 10.30 a.m. Details of the proposed Group were first announced in *Aslib Proceedings,* April 1965, page 99. The agenda for this meeting have already been sent to members of the Group.

Mr Geoffrey Woledge: Honorary Member of Aslib

The Council has conferred Honorary Membership of Aslib on Mr Geoffrey Woledge, B.A., A.L.A., who is to retire shortly from the post of Librarian of the British Library of Political and Economic Science which he has held since 1944.

Mr Woledge was Honorary Secretary of Aslib from 1949 to 1951, during the formative years of Aslib, following the amalgamation of the Association of Special Libraries and Information Bureaux with the British Society for International Bibliography. He was a member of Council continuously (with the exception of the years 1957–9) and held important offices on the Education Committee, Publications and Editorial Committee and Executive and Finance Committee over long periods. In addition, he was Chairman of the Editorial Board of the *Journal of Documentation* from 1949 to 1965 and, in this capacity, played a major part in building up, and maintaining, the high reputation of this journal as one of the world's leading publications in the field of documentation.

Geoffrey A. Shires

Many Aslib members will wish to join his other friends in congratulating Mr G. A. Shires on being awarded the 15th Hancock Medal of the Institution of the Rubber Industry for 'outstanding services to the Institution and the industry'. For eleven years he was secretary of the Midlands Section of the Institution and later chairman of its Papers and Publications Committee, giving unstintingly of his time and energy.

Aslib members knew Mr Shires as a member of Council for many years and for service on many of its committees. He retired only recently after long service as Manager of the Research and Technical Information Service of the Dunlop Rubber Company Research Centre in Birmingham. His main professional work was the collection and dissemination of technical information, and to that task he brought rare and appropriate gifts of imagination, pertinacity and patience. A colleague has written elsewhere: 'One of the traits I liked about his services to the Technical Department and later the Research Centre (at Dunlops) was his willingness to experiment with unorthodox methods of bringing items of information to the attention of the scientists and technologists he served.'

National Central Library

The forty-ninth annual report of the Executive Committee of the National Central Library, for the year ending 31st March 1965, records a considerable increase in interlending. Of the 119,668 applications received (11 per cent increase on the previous year) 111,972 were proceeded with, and of these 86,218 (77 per cent) were satisfied. Loans from the Library's own stock amounted to 15,638 (18.3 per cent of successful applications).

A survey of applications, January–June 1964, was completed and results submitted to the University Grants Committee and the Department of Education and Science.

Much work has been done on the amalgamation of catalogues resulting in a new union catalogue of books containing over 1,100,000 cards divided into five sections: personal and corporate authors, conferences, government publications, music and pre-1801 books.

The year under review saw the continuation of the British Union Catalogue of Periodicals, from 1960, in the publication of the quarterly periodical subtitled 'New Periodical Titles'.

Dr H. R. Lang

The sudden death on 18th November of Dr Lang, Secretary of the Institute of Physics and the Physical Society, will have come as a sad shock to the many Aslib members who knew him. Dr Lang was a good friend of Aslib and was well aware of the importance of its work in the world of physics. Through him Aslib was given valuable opportunities to speak at meetings of physicists, to contribute to the Institute's and to the Society's publications, and to give advice on current problems within its sphere. Aslib staff, whose near neighbour Dr Lang was in Belgrave Square, will miss his brisk, cheerful presence. Our sympathies go to his widow Dr Ruth Lang and his three sons.

Classification of library science

We are asked to inform readers that the *Classification of library science, preliminary draft edition,* prepared by the Classification Research Group, is now out of print.

Guide to metallurgical information

The second edition of this guide is now available. Its purpose is to provide annotated references to sources of information on all aspects of metallurgy. Coverage is worldwide, with emphasis on current information sources such as trade and professional associations, government agencies, etc., as well as published indexes, abstracts, serials, guides, etc. Approximately 500 new items have been added since the first edition in 1961, bringing the total to over 1,100 entries. Non-English language sources have been increased, new editions and volumes noted and addresses added. Pre-1945 titles have been reviewed for retention. Detailed indexes are provided for organizations, titles and subjects.

Where information centres or abstracts, etc., exist on specific metals, they are listed under the metal, and this arrangement is less easy to use than that in the first edition, but the guide will prove invaluable to all concerned in seeking metallurgical information.

The guide is available from: Special Libraries Association, 31 East 10th Street, New York 10003. Price $7.00.

Editing qualifications

Examinations in technical and scientific editing will be offered in 1967. The City and Guilds of London Institute's Advisory Committee on Technical Writing and Technical Authorship, having established a specialist panel to consider the matter in detail, has prepared regulations and syllabuses for a scheme in technical and scientific editing (Subject no. 336) which has now been adopted by the Institute.

The idea is to encourage the provision of courses lasting a minimum of 100 hours in the main centres of population. Candidates, it is expected, will, in general, be of graduate or higher national certificate calibre, and it is felt that publishers, both in the commercial Press and in the learned societies and institutions, will welcome courses which give formal training to entrants to the profession of editing and refreshment training to existing staff.

Special attention has been given in drawing up the syllabus to the needs of the technical book publisher. The syllabus comprises: the development of English as a written and spoken language; the role of communication in a technological culture; a survey of present-day technical and scientific literature; the mechanics of publishing; the editor and his main responsibilities; the mechanics of editing; the role of the sub-editor; and the process of sub-editing.

Further information may be obtained from the City and Guilds of London Institute, 76 Portland Place, London W1.

Course on Work with Patents

Patents are an important source of technical information, but owing to peculiarities mainly caused by their status as legal documents they are not used as much as they should be. In most organizations patent work is dealt with by specialists, but a good understanding of patents is of great value to information officers. Aslib is therefore once again holding its course on work with patents and elementary law, on Tuesday and Wednesday 8th and 9th February 1966.

The lecturer will be Mr Felix Liebesny, B.SC., A.L.A., F.I.INF.SC., Information Officer, the British Aluminium Company Ltd. The course is intended for people whose work is concerned with the administration and exploitation of patents, and will not deal with detailed aspects of patent law. The fee for the course will be six and a half guineas. The programme is enclosed with this issue, and applications should be made to the Education Officer, Aslib, on the form supplied with it.

INFORMATION PROBLEMS IN THE SOCIAL SCIENCES, WITH SPECIAL REFERENCE TO MECHANIZATION

D. J. FOSKETT, M.A., F.L.A.

Librarian, University of London Institute of Education

Paper presented at the 39th Aslib annual conference, Keele, 30th September 1965

A WELCOME sign of the growing recognition of the need for more attention to research and documentation in the social sciences can be found in the Report of the Committee on Social Studies under the chairmanship of Lord Heyworth.[1] Not that the report has a great deal to say on the documentation aspect; it has a few fairly cordial references to libraries, and a paragraph mentioning their inadequacies, with a recommendation that national lending facilities should be provided. But the committee were evidently aware of the need for better collection and dissemination of information, and regarded this as one of the major tasks of the Social Science Research Council, of which Dr Michael Young, Director of the Institute for Community Studies, has now been appointed chairman.

One can easily find parallels to the situation that existed in science and technology half a century ago: the growing awareness of the need for, and the practical value of, research; the increasing attention of universities and industries; the research worker's consciousness of his own inability to cope with the flood of publication; and so on. But we have, of course, one inestimable advantage over those predecessors of ours who met at Hoddesdon in 1924 to found Aslib, because we have their experience and wisdom to draw on; and although in this paper I may seem to concentrate on differences, let me make it clear at the start that this is only because I take it for granted that we shall not be so foolish as to fail to take advantage of such previous experience as proves of value. For example, the success of the NLLST seems to me to go far to justify the opinion that a national loan collection would benefit social scientists; but this remains an opinion, and no more, until it is backed by investigations of the kind that Dr Urquhart made before starting on his missionary trail We do, I think, have to be particularly careful not to assume too readily that because certain theories and practices prove satisfactory in one field (the natural sciences, say) they must *ipso facto* prove so in all others. Such a view would bring scorn, not approval, from our colleagues the research workers.

Perhaps the most obvious problem in social science documentation is that of terminology. Things have improved in science since Dr Holmstrom's exclamation that its terminology resembled a jungle rather than a garden, but his words still apply in the social sciences. This is partly because the social scientist usually finds himself dealing with matters of everyday, for which everyday terms, many and varied, are used even by the experts. Attempts to constitute vocabularies of specialist terms, therefore, are bound to meet with more than the usual resistance. For although no one would dispute the need for new terms for new phenomena, we are less ready to accept what may be advanced in all earnestness as a new term when we feel that we are not dealing with a new phenomenon. This is illustrated by the difficulties that arise, for example, in connection with translation, where the author himself has chosen to use an everyday term for which there is no exact equivalent. W. G. Runciman's comment is illuminating: Max Weber's term 'Stände' is usually translated as 'status-groups', but ' "status-stratum" would be more accurate; and "status-stratum" is really too much of a mouthful, even for social scientists'.[2] It is clear, however, that 'stratum' and 'group' do not mean the same thing. These problems are in addition to the more ordinary varieties—synonyms, homonyms, and the like. My attention was sharply attracted recently by an article title which read 'Attitude and pupil size'. All these terms are well known in the field of education; here, I thought, was an unusual study of the relation between the size of pupils (perhaps a function of malnutrition) and their behaviour in school. Nothing of the kind; it reported in all seriousness (it was in the *Scientific American*[3]) the fact that when male students are shown pictures having a certain kind of appeal their eyes bulge; 'the pupil responds' (says the caption) 'to changes in attitude as well as to changes in illumination'.

Another problem that is of fundamental importance (though it may have been exaggerated in some respects) is the nature of social science data. Social scientists have become rather jaded with the arguments about 'value judgments', so I will not harp on them except to say that they are inescapable in fields where we are dealing with people—that, for example, we do not take the doubtless more efficient step of scrapping sub-standard products when they are human beings. Moral and spiritual considerations outweigh the merely technical. But many of the data of social science are just as 'objective' and merely factual as those of a natural science or technology; indeed, one of the blessings that computers have brought is that we can now, for the first time, collect and handle enough data to make our statistical work valid to a remarkable extent. Whatever our political value judgments, as it were, we cannot fail to be impressed by the performance of computers in general elections.

What I want to emphasize, rather, is another point made by Runciman,[4] namely that we are masters of our own destinies, and that therefore any prediction in social science, though based on impeccable investigations and statistics, may well bear the seed of its own destruction and suggest actions that will make it untrue. Thus a computer-based prediction of an election result may well incite the likely losers to a coup by force of arms. The 'self-falsifying prophecy' has to be taken into account: but, as Runciman says, its existence does not make it totally unprofitable to make generalizations and predictions. On the contrary, it seems to me to make them even more worth while.

The structure of many social science fields is, like the terminology, far from precise. The Heyworth Report shows how recently many of them have begun to appear as formal and continuing studies in universities, in spite of the fact that most were discussed in the Academy, the Lyceum and the Porch. The literature, unlike most of natural science literature, preserves its validity for a long while (which also makes problems for librarians), but this fact has not brought more stability to the structure of the disciplines, partly due to the lack of data—more than one opinion can easily be supported when only a little information is available. It is also partly due to the lack of classification in these fields; as Professor Donald MacRae puts it: 'Most of the great sociologists can be thought of as trying to produce theories of Newtonian ambition about Society . . . what, in all probability, sociology most needs at the moment is not either a Newton or a Darwin but a Linnaeus to elaborate a really workable classification of social structures and of the range and variety of institutional patterns and sequences'.[5]

One result of this lack of structure is an accentuation of the well-known tendency of readers to generalize their requests, making specific indexing a more chancy operation. Consider the title of this project report: 'The measurement of the effectiveness of the documentary sound-film as a supplement in the teaching of methods to college students being prepared to teach in the secondary schools'.[6] It contains many terms whose individual significance cannot be denied; but unless it is indexed under 'teacher education', which it does not contain, it will be missed by the vast majority of interested readers who will certainly use that term. All the notions in the phrase 'the teaching of methods to college students being prepared to teach in the secondary schools' are contained in the term 'teacher education'—yet another instance of the need for classification as a basis for information retrieval.

These, and other problems such as the breaking-up of traditional disciplines and the infiltration of charges of emotion into words like 'democracy', have been dealt with more fully in my book on *Classification and indexing in the social sciences,* and by Barbara Kyle in several articles. But it is time to turn to considering what is being done about them.

Perhaps the first thing to be said is that more work is going on than one might imagine on a first inspection. Through the International Committee on Social Sciences Documentation Unesco has been doing outstanding work for several years, and its series of specialized Social Science Bibliographies have set a fine example in their range and accuracy. The committee has a very full programme in view, including some work on automation, and only the chronic lack of funds from which it has always suffered has prevented it from making a visible, practical contribution of the same order as we see in science. The International Social Science Council has held two conferences on data archives, which have been reported in *Social Sciences Information.* The second, at Paris in September 1964, included a session devoted to the Technology of Storage and Retrieval. Both Unesco's *International Social Science Journal*[7] and *The American Behavioral Scientist*[8] last year devoted whole issues to discussing the collection and retrieval of information, and a recent issue of the *News-Letter* of the American Council of Learned Societies lists an impressive number of American research projects benefiting from, or indeed made possible by, the use of computers.[9] Naturally, I have no time for more than a mere mention of the role of data collection, exemplified by such organizations as the Zentralarchiv at the University of Cologne,[10] the Inter-Universities Consortium for Political Research centred on the University of Michigan, or the many school timetables and concordance-type projects on the works of famous authors. Perhaps it will suffice to say that all this work is very encouraging, even if not all the lessons available from the documentation of the natural sciences have been learned.

On the specific issue of information storage and retrieval we also have several years of effort behind us, but only recently has the pace of computer-based study begun to quicken. The Law, as we know, is the true embodiment of everything that's excellent, and one of the oldest projects, perhaps the best known, is that of John Horty of the Health Law Center at the University of Pittsburgh, who has remarked that, of the social sciences, law offers about the best vehicle for a mechanized retrieval system because precision in terminology is always sought and usually achieved.[12] Moreover, searching the literature is an operation basic to all legal inquiry. Horty has indexed all the statutes of the State of Pennsylvania, and the statutes of other states that relate to health law. Statutes are particularly suitable because they are short, confined to one concept, and written in carefully chosen terms, and Horty has chosen to index the entire text. This has come in for some sharp criticism from other experts, who stress the cumbrousness of the operation and the large amount of unnecessary material likely to be encoded. I reserve my judgment until we hear the results of a parallel study begun by Colin F. Tapper at the London School of Economics and being continued at the University of Oxford. Tapper has published some excellent articles,[13] which contain reasoned discussion of the principles involved in legal indexing, and not simply a descriptive account of his work. The first efforts took a given area of law and indexed all the materials for both legal concepts and fact situations. This proved disastrous, because the concepts turned out to be not nearly so well defined as had been thought and the indexers were quite inconsistent in indexing the same documents. It has therefore been decided to change to the Horty approach, and encode whole texts, using case law instead of statutes, with the exercise limited by time and not by subject. In addition, Tapper has been encoding the United Kingdom Public Health statutes in order to carry out comparative tests with Horty and his team at Pittsburgh. (Figure 1.)

The University of Pittsburgh has also housed another legal project, reported by J. W. Asher and M. Kurfeest,[14] who have used the Horty technique in the field of school law. This has particular interest, in that one set of questions was both run on the computer and searched manually by a lawyer. The results showed that although the computer pulled out a large proportion of irrelevant material, this material could be quickly scanned and rejected, and a number of highly relevant items not discovered by the lawyer were also retrieved.

Other schemes that can only be mentioned are the Human Relations Area Files, the General Inquirer System of the Department of Social Relations at Harvard, and the History of Education system at the University of Michigan. The Center for Documentation and Communication Research at Western

Reserve University has also embarked on an education project, first in the documentation of educational media and lately in the field of educational research. This is of unusual interest, because it has been handsomely supported by the U.S. Office of Education and also because the WRU team are following their own practice in technical fields—that of assembling a 'User Group' of specialists who submit the questions and evaluate the replies. This is one project that has not failed to learn from previous experience—notably from the comparative study made by Mr Cleverdon and his colleagues at Cranfield.

No review of this type could be complete without a reference to the work of Jean-Claude Gardin, in France. I personally regard this as of the first importance, in both its theoretical and its practical aspects. His is one of the few general theories that began in a social science field (archaeology and cultural anthropology), and has now moved over into the natural sciences and technologies. Since the publication of his Rutgers Seminar, *SYNTOL*, in English, this work is probably better known, but the best exposition of it is contained in the joint work of Cros, Gardin and Lévy, *L'automatisation des recherches documentaires: un modèle général, Le SYNTOL.*[15] In brief, Gardin's system attempts to reconcile the traditional type of logical division, a series of A and not-A steps, with the needs of modern research literature by introducing a network of relations. The results recall the analets of Mr Farradane, though the relations are not, like Farradane's operators, based on psychological operations so much as a form of dichotomous, logical division of process terms. In one version of SYNTOL, a faceted classification of terms can be incorporated as a means of vocabulary control. This research programme is being undertaken by the CNRS, Section d'Automatique Documentaire, which submitted an English account to the International Conference in the field of Documentation on Development Assistance, held in Berlin in October 1964 by the Deutsche Stiftung für Entwicklungsländer.

One of the first practical applications of SYNTOL in automatic documentation has begun, in collaboration with EURATOM, at the Maison des Sciences de l'Homme in Paris, where the Centre d'Analyse Documentaire pour l'Afrique Noire recently issued Nos. 1 and 2 of its bibliography, containing 545 abstracts with SYNTOL classification numbers. A paper by Mme F. Izard was presented to the African Studies Association meeting at Columbia University in October 1961, and in June 1964 CADAN issued a mimeographed list of classified headings for its abstracts. Each abstract is given as many SYNTOL numbers as it requires, and these numbers are usable for the mechanized production of subject bibliographies.[16]

CADAN is also currently at work on a programme in physiology, psychology, sociology and cultural anthropology. Some 3,000 documents were collected, analysed and indexed by SYNTOL rules; fifty questions were then used, illustrating the various kinds of literature search that the centre might expect. The search was done on an IBM 7090, and the results showed (*a*) that full use needed to be made of all the logical mechanisms in SYNTOL, and (*b*) that better results could be achieved if the rules of indexing were more formalized—this has led to an investigation of automatic analysis into SYNTOL, and (*c*) that rules for converting questions into search strategies need to be discovered.

Some Keyword-in-Context indexes have lately made their appearance, and I think it worth commenting on them in a little detail, because they illustrate more than one important principle. In 1964 a KWIC Index to Comparative Education was published by the University of Michigan (I will be reticent about this, like Aristotle on the theory of 'forms', since the compilers are friends of mine). Apart from the inclusion of entries under such words as 'GREAT', 'LIST', 'PRESENT', and others which can hardly be envisaged as search terms at all, the Index fails badly in providing no connecting links between related terms or even synonyms. Thus the first four items appear under the word 'ABROAD' ('Schools at home and abroad', 'Secondary education abroad', etc.); but there is no link from these to the twenty-eight items under FOREIGN, which is, in this context, virtually a synonym.

The same faults occur in *Perceptual Cognitive Development,* published by the Galton Institute, Los Angeles, of which vol. 1, no. 1, has just appeared. For some 400 items in the bibliography there are about 2,200 index entries. The introduction claims that non-informative words have been eliminated; nevertheless, among the entries are ACQUISITION, BOOKS, CERTAIN, COURSE, DESCRIPTION, IRRELEVANT, PHILA (i.e. Philadelphia, the home of the publisher of this item) and SUGGESTED. On the other hand, for the item entited 'The development of self-recognition from anterior, profile and back views of the human body' there are entries for ANTERIOR and PROFILE but none for BACK or VIEW. The following sequence occurs under II (hardly a sought term, one would think).

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  A RESEARCH STRATEGY, II. A CLASSIFICATION OF FORMS OF THINKING  WYNNLC-64-0226
E PREFERENTIAL EFFECT. II. A LANGUAGE ESP TEST INVOLVING PRECOGN  RAD KR-64-0779
THE SMILING RESPONSE.  II. VISUAL DISCRIMINATION AND THE ONSET O  POLAP-64-0407
C JUDGMENTS. AGE, SEX, I.Q. AND CERTAIN PERSONAL-EXPERIENTIAL VA  WHITPH-64-0843
IONS IN SCHIZOPHRENIA. I. A RESEARCH STRATEGY, II. A CLASSIFICAT  WYNNLC-64-0226
PMENT RESEARCH. VOLUME I. NEW YORK. RUSSELL SAGE FOUNDATION, 196  HOFFML-64-0020
```

The principle of alphabetization used here escapes me. Even allowing for the difficulty of removing all non-informative words however, what can we do about this pair:

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CHILDREN'S CONCEPTS OF   VOLUME. (ABSTRACT) / THE DEVELOPMENT OF  BERGBJ-64-0474
DEVELOPMENT RESEARCH.    VOLUME I. NEW YORK. RUSSELL SAGE FOUNDATI  HOFFML-64-0020
```

There is the usual disturbing lack of cross-references. One entry under BACKWARD, three others under EDUCABLE, twenty-one under RETARDED, which include the EDUCABLE but not the BACKWARD; none at all under SUB-NORMAL, which is certainly a likely search term for these articles. And, of course, there is a sprinkling of the intriguing, caused by the line-length limitation. I particularly liked this one:

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N.                       CHEMICAL AND ANATOMICAL PLASTICITY OF BRA  BENNEL-64-0610
```

but the bibliography revealed that the letter 'I' had disappeared from between the BRA and the N. Similarly, the moronic nature of the print-out gives the first line of the first entry in the bibliography itself as:

```
THE BODY IMAGE. REPORT OF A SYMPOSIUM HELD AT FOURTH INTERNATIONAL STUD
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an all-important Y having gone over to stand by itself at the beginning of line 2.

Even the speed of publication is not impressive, as the editors are allowing for two to five months after the appearance of the originals.

I have reproduced these details not merely to emphasize faults which are already notorious, but in order to pose what to me is a vital question. All my experience leads me to conclude that what users want is a form of access that is quicker, easier and more effective. I cannot see that the KWIC Index meets any of these requirements; and I certainly would resist the lowering of the standard of entry that is inevitable with the combination of titles and limited line-length. I am glad to say that CADAN has rejected any form of KWIC Index

I think this warning is necessary because, although *New Society* thinks that KWIC indexing is the 'least-publicized' technique in this field, Professor Kenneth Janda, of the Department of Political Science of North Western University, has claimed that it is the most widely used computer-derived retrieval method in use today, and that it holds great promise for the behavioural sciences. When we consider all the thought and experience that has gone into devising indexing systems with the specific aim of saving the time of the user, it is little short of monstrous that we should now be inveigled into such morasses, disregarding utterly the convenience of users simply in order to make use of a supposedly speedier technique of indexing.

Fortunately, it has been convincingly shown that mechanized subject indexing is capable of producing indexes of the same standard as conventional card catalogues or even higher. The English Electric index to reports and the Selective-Listing-in-Combination devised by J. R. Sharp show what can be done without abandoning normal standards, and I have no doubt that these techniques would be applicable to the social sciences, provided that one had a controlled vocabulary of terms to begin with.

On a humbler, but no less useful, level we have recently arranged with the *British National Bibliography* to print the catalogue of periodical holdings of the University of London Institute of Education. We wished to have a complete alphabetical sequence of entries, a country index of titles, and separate lists for re-ordering and binding. Copy is prepared on 80-column ICT cards, one line per card, using a variable-face typewriter. Codes for the necessary information are punched in; the cards are automatically sorted into alphabetical order of titles, and photographed on a Foto List sequential camera, producing a negative from which an offset litho plate is prepared. The cards are then re-sorted by the country code, and since we now require only the title line the cards carrying other details are automatically sorted out. Extra cards with the names of countries are dropped in and the new sequence photographed. This completes the operation for the printed volume, and the cards are re-sorted into the original alphabetical sequence. For re-ordering and binding the appropriate cards are sorted out on a high-speed sorter and run through the camera. After each Foto List run a diazo proof is supplied for checking before the plate is made. (Figure 2.)

The *BNB* technique shows that some mechanization is possible even without a computer, and it is interesting to recall that the Los Angeles Public Library, which began a computer-printed catalogue several years ago, actually changed over to a punched card and sequential camera method because it was more economical and gave a better print-out. This last point can still be a difficulty, as the Barnet Public Library catalogue shows; but the success of Medlars in providing variable-face types is now well known, and—not so well known, perhaps—a like success has been achieved by the Toronto University Library in printing a union catalogue.

This advance removes at last what has been the biggest single drawback to the use of computers in documentation—the hideous appearance of the print-out. It now seems to be fairly generally agreed that the speedy production and up-dating of printed lists meets a long-felt and acute need in libraries. The spiral of history has brought us back, on a higher level, to the day of the codex form of catalogue, so much more usable and acceptable to readers. This may well be of greater significance in the social than in the natural sciences. One of the characteristics distinguishing the two—so far as documentation goes—is that social science literature tends to be more cumulative, in the sense that it does not go out of use so quickly. We can still read Aristotle with profit on politics, if not on biology. Publishers are certainly cashing-in on the boom, by reprinting classics that are out of copyright (Marx, Weber, Durkheim, for example), but the great standard editions—and consequently their catalogue entries—are still sought and used. Emphasis on current publication in periodicals, though considerable, is nothing like so preponderant as in science and technology. I suspect too (though I have no real evidence for this) that the play of serendipity is greater. Thus, while we certainly need the speedy indexing and abstracting of current publications, we also need a wider knowledge of the continuing availability of older work—perhaps in the form of bibliographies and even union catalogues, as well as of national lending libraries.

To one whose scepticism, in the matter of mechanized information retrieval, has sometimes triumphed over his generally optimistic view of progress in improving information services, the ebb and flow of public opinion is not without its lighter aspects. After so much advertising of instant reference service at the push of a button, the equally headlong retreats that we now sometimes witness demonstrate only the flimsy basis for either view, at the extreme. That there is ample scope for mechanization I have no doubt; what form it should take seems less clear. It seems to be forgotten sometimes that the final act in information retrieval is the perusing of an actual document about something—not merely the address of that document. The more information that can be put into an address list, therefore, the more work will be saved for the reader (or the information officer). For this reason an English Electric index with its subject analysis, or a SLIC index with its various combinations, is so superior to the more mechanical KWIC lists as to make these no longer worth considering.

But how shall we arrive at subject analyses that are superior to titles? I believe that it is at this stage that classification and relational analysis come into their own. In the social sciences we shall still require classification with printed catalogues, in order to have some principle for arranging the entries; an alphabetical subject catalogue, as has often been shown, may conceal, but cannot eliminate, its classification basis. Brilliant discoveries are being announced by the compilers of thesauri. As Frederic Jonker[17] says, 'If we wish to make generic searches, the generic relationships . . . can be noted in the access guide or thesaurus', though he has not yet come across the idea that a subject may be divided into more than one category, or facet, and that combination of terms from all of them can be as free as is required by the literature.

Not so Leon Rolling, of Euratom.[18] 'It is well known,' he says, 'that classifications are gradually replaced by systems of independent key words'; but his system has advanced from simple key words to key word groups—a powerful tool indeed. 'For example,' he says (on another page), 'a request concerning "The use of radioactive cobalt for the preservation of canned food" will be represented by the following key-word combination: (Cobalt 60 *or* Gamma sources *or* Gamma radiation) *and* (Preservation *or* Sterilization) *and* (Food *or* Meat *or* Eggs *or* Milk *or* Vegetables *or* Fruit *or* Cereals) *and* (Packaging *or* Storage).' O brave new world, that has such ideas in it!

Horace, as so often, had an appropriate comment: Naturam expellas furca, tamen usque recurret—you drive out nature with a pitchfork, but she keeps coming back. There are two aspects of this here. The first I will put in general terms, to avoid an argument over epistemology (even though I think this is fundamental). There is a pattern in nature, of which we are a part, and the literature we have to organize attempts, with greater or lesser success, to describe that pattern. It seems, therefore, both logical and helpful to arrange the literature so that it shows up at least some of the pattern, even if it is impossible to reveal it all at the same time.

The second point is more weighty. As J. R. Sharp[19] has emphasized in his recent book, the key process in information retrieval is that of matching the terms used by an inquirer with the terms used in the index to a store of information. This process is far from simple; Alan Rees[20] has commented both on the dangers of failing to consult the questioner during question analysis and on the likelihood of the questioner's requiring different documents to satisfy the same need, today and tomorrow. The discussions on relevance/precision sparked off by the Cranfield reports represent an important step forward in the evaluation of retrieval systems, because, as Rees says, 'the language of questions represents in many cases an attempt to *form* and *define* concepts'. At the very heart of information-seeking, of learning itself, is the formation of concepts and their expression in language.

Now we know a fair amount about both, thanks to the work of experimental psychologists such as J. P. Guilford, Jean Piaget and J. S. Bruner, and of linguistics workers such as Louis Hjelmslev, L. S. Vygotsky and A. R. Luria. Time forbids a detailed review of such work, but all of it points to one conclusion of significance for us: that concept-formation is a process of making classes, and that we only grasp and master the significance of natural phenomena when we have fitted new impressions, observations and sense-data into a pattern or system. Shera[21] quotes another American psychologist, David Rapaport, 'the fundamental question which concept-formation answers is: what does an idea belong with?' Vygotsky,[22] the importance of whose work is only now being realized after thirty years, has an illuminating image: 'Concepts do not lie in the child's mind like peas in a bag, without any bonds between them. If that were the case, no intellectual operation requiring co-ordination of thoughts would be possible, nor any general conception of the world. Not even separate concepts as such could exist; their very nature presupposes a system.'

Thus when a reader formulates a question stating a lack of information, he is performing an act of classification; and this is what library classification has set out to reflect. The trouble is, of course, that intellectual classifications are not simple hierarchies, but multiplicative,[23] while the traditional general bibliographical schemes are not. Faceted structure has pointed the way forward, but is probably inadequate by itself. Used in conjunction with a system of relations as by Farradane and Gardin, it should provide us with a very powerful tool for subject analysis, reflecting the thought processes of questioners, and also commensurate with the intricacy of the operations made possible by automation.

Research, however, is lacking in these areas. I should like to see a programme, like that of Mr Hanson, investigating both the way social scientists structure their thinking in their subject and also the way in which they use the literature in the process. This would have far-reaching implications, not only for librarians in social science fields but for all of us in our professional lives. For whether we like it or not, information science is itself a *social* science. Basically, we are not concerned with the discovery of more facts and their setting forth in the record. We are concerned with the communication of information in its many and varied aspects: facts, ideas, opinions, prejudices. Neither are we solely concerned with the mere transmission of marks on tallies. We are concerned with meaning, significance, and purpose—all *social* phenomena. The information theory that satisfies telephone engineers does not, and ought not to, satisfy us. If it did, we should have every reason to fear the machines, because they would certainly replace us. But we are concerned, not merely with information, not even with knowledge, but with the knowledge refined by experience that becomes wisdom; and as is written in the book of Ecclesiasticus: 'The wisdom of a learned man cometh by opportunity of leisure'.[24] If we understand rightly our own profession, its techniques and its role in society, it is civilized leisure, above all, that the machines have to offer.

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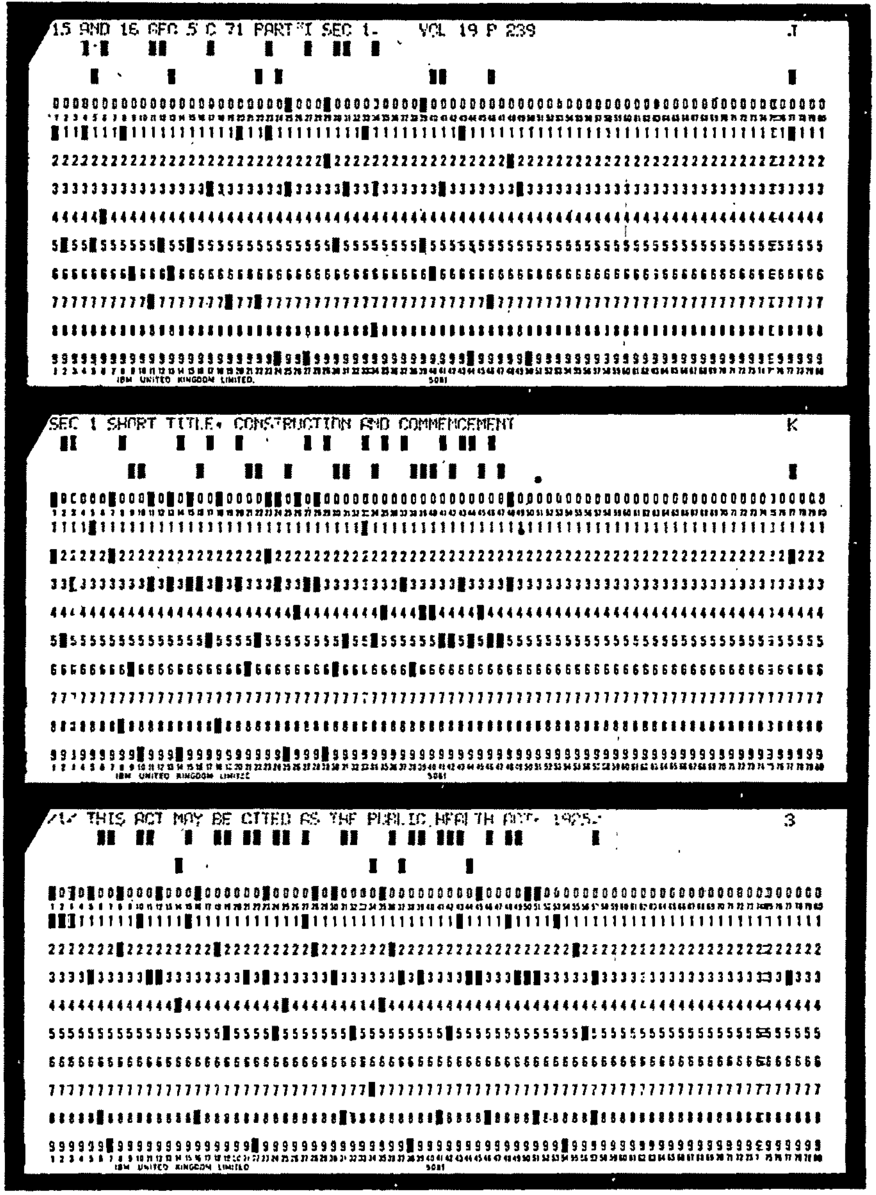
continued on p. 342.



15 AND 16 GEO 5 C 71 PART I SEC 1. VOL 19 P 239 J

SEC 1 SHORT TITLE, CONSTRUCTION AND COMMENCEMENT K

(1) THIS ACT MAY BE CITED AS THE PUBLIC HEALTH ACT, 1925. 3

IBM UNITED KINGDOM LIMITED.
5081

FIGURE 1

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15 AND 16 GEO 5 C 71 PART I SEC 1.    VOL 19 P 239                  J
SEC 1 SHORT TITLE, CONSTRUCTION AND COMMENCEMENT                    K
/1/ THIS ACT MAY BE CITED AS THE PUBLIC HEALTH ACT, 1925.           3
/2/ PARTS I TO VIII OF THIS ACT AND THE PUBLIC HEALTH ACTS, 1875 TO 1907,  3
MAY BE CITED TOGETHER AS THE PUBLIC HEALTH ACTS, 1875 TO 1925.      3
/3/ PARTS I TO VIII OF THIS ACT SHALL BE CONSTRUED AS ONE WITH THE  3
PUBLIC HEALTH ACTS, 1875 TO 1907.                                   3
/4/ THE EXPRESSION ,,THE COMMENCEMENT OF THIS SECTION,, WHEN USED IN ANY  3
PROVISION IN PARTS II TO V OF THIS ACT, MEANS THE DATE ON WHICH THAT  3
SECTION COMES INTO OPERATION WITHIN THE DISTRICT OF THE LOCAL AUTHORITY  3
BY VIRTUE OF AN ADOPTION OF THAT PROVISION, OR OF AN ORDER OF THE   3
MINISTER OF HEALTH.                                                 3
/5/ THIS ACT SHALL COME INTO OPERATION ON THE EXPIRATION OF ONE MONTH  3
AFTER THE PASSING THEREOF.                                          3
PARTLY REPEALED PUBLIC HEALTH ACT 1936 SEC 346 AND SCHEDULE 3 PART IV  L
PUBLIC HEALTH ACT - PUBLIC HEALTH AND LOCAL ADMINISTRATION          M

15 AND 16 GEO 5 C 71 PART I SEC 2.    VOL 19 P 239                  J
SEC 2 EXTENT OF ACT                                                 K
/1/ THIS ACT SHALL NOT APPLY TO SCOTLAND OR NORTHERN IRELAND.       3
/2/ PARTS II , III, IV AND V OF THIS ACT ARE ADOPTIVE, AND SHALL EXTEND  3
IN SO FAR AS THEY MAY BE ADOPTED, TO ANY DISTRICT FOR WHICH THEY ARE  3
ADOPTED IN ACCORDANCE WITH THE PROVISIONS OF THIS ACT.*             3
PROVIDED THAT, WHERE POWERS ARE CONFERRED ON A COUNTY COUNCIL BY ANY  3
SECTION IN PART II OF THIS ACT THOSE POWERS MAY BE EXERCISED BY THE  3
COUNCIL WITHOUT AN ADOPTION BY THEM OF THE PROVISIONS OF THAT SECTION.  3
PARTLY REPEALED BY PUBLIC HEALTH ACT 1936 SEC 346 AND SCHEDULE 3 PART IV.,  3
BY PUBLIC HEALTH /LONDON/ ACT 1936 SEC 308 AND SCHEDULE 7., BY      3
PUBLIC HEALTH ACT 1961 SCHEDULE 5 PART II., AND BY LONDON GOVERNMENT ACT  3
1963 SCHEDULE 18 PART II., MODIFIED LONDON GOVERNMENT ACT 1963 SCHEDULE  3
11 PART I PARA 9                                                    L
PUBLIC HEALTH ACT - PUBLIC HEALTH AND LOCAL ADMINISTRATION          M

15 AND 16 GEO 5 C 71 PART I SEC 3.    VOL 19 P 240                  J
SEC 3 ADOPTION BY URBAN AUTHORITIES OF PARTS II TO V                K
ANY URBAN AUTHORITY MAY ADOPT ALL OR ANY OF THE SECTIONS CONTAINED IN  3
PARTS II, III, IV AND V OF THIS ACT.*                               3
PROVIDED THAT, WHERE THE DISTRICT CONTAINS, ACCORDING TO THE LAST   3
PUBLISHED CENSUS FOR THE TIME BEING, A POPULATION OF LESS THAN TWENTY  3
THOUSAND, THE ADOPTION BY THE COUNCIL OF THAT DISTRICT OF           3
/A/ THOSE PROVISIONS IN PARTS II AND III OF THIS ACT WHICH ARE MENTIONED  3

IN THE FIRST SCHEDULE TO THIS ACT., OR                              3
/B/ ANY PROVISION IN PART V OF THIS ACT.,                           3
SHALL NOT TAKE EFFECT UNTIL THE CONSENT OF THE MINISTER OF HEALTH HAS  3
BEEN OBTAINED THERETO, AND SUCH CONSENT MAY BE GIVEN BY AN ORDER OF  3
THE MINISTER AND SUBJECT TO SUCH MODIFICATIONS, CONDITIONS OR       3
RESTRICTIONS AS MAY APPEAR TO HIM TO BE NECESSARY OR DESIRABLE.     3
REFERENCES TO PARTS III, IV AND V OF THIS ACT REPEALED PUBLIC HEALTH  3
ACT 1936 SEC 346 AND SCHEDULE 3 PART IV., MODIFIED LONDON GOVERNMENT ACT  3
1963 SCHEDULE 11 PART I PARA 9                                      L
PUBLIC HEALTH ACT - PUBLIC HEALTH AND LOCAL ADMINISTRATION          M
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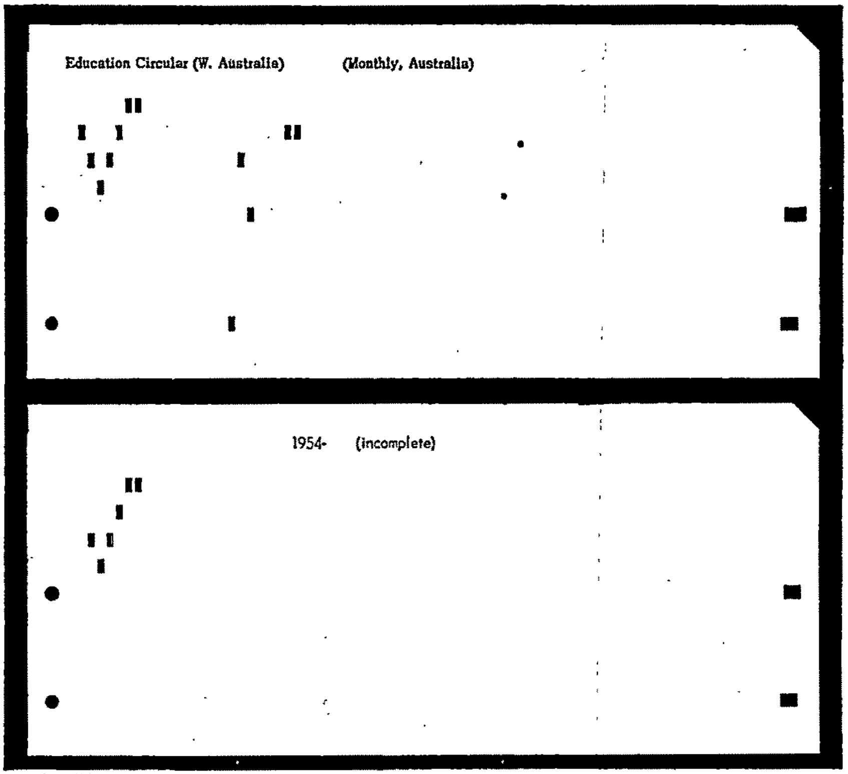
UNIVERSITY OF LONDON INSTITUTE OF EDUCATION LIBRARY

LIST OF PERIODICAL HOLDINGS

Sequence of operations done at the Production Unit of the British National Bibliography.

1. Entries are typed on to 80 col. tabulating cards. Only one line is typed on each card.
2. Various codes are punched into each card.
    - (a) Alphabetical sequence code
    - (b) Country sequence code
    - (c) Re-ordering code
    - (d) Binding code
3. Make up is done by counting cards on a Totometer and adding headlines and page no.
4. The cards are passed through a Fotolist camera and a negative is produced.
5. All periodical title cards are automatically extracted and re-arranged by country.
6. These cards are made up into pages and photographed as before.
7. The complete sequence is re-assembled into alphabetical order. It can now be returned and used as an office file. When lists of periodicals requiring binding or re-ordering are required, they can be simply and cheaply produced.



Education Circular (W. Australia) (Monthly, Australia)

1954- (incomplete)

FIGURE 2

SAMPLE OF ALPHABETICAL LIST

L'Education Nationale with supplements		(Weekly, France)
No.12-	1951-	
Education Gazette (New South Wales)		(Monthly, Australia)
	1953-	
Education Gazette (S. Australia)		(Monthly, Australia)
	1951-	
Education News (Bulletin of the Commonwealth Office of Education)		(6 per annum, Australia)
	1947-	(incomplete)
Education Quarterly (Ministry of Education, India)		(Quarterly, India)
No.10- (incomplete)	1951-	
Educational Administration and Supervision		(U.S.A.)
	1960-	
Educational and Psychological Measurement		(U.S.A.)
1-	1941-	
The Educational Forum		(Quarterly, U.S.A.)
7-15 (incomplete)	1942-50	
23-	1958	

SAMPLE OF COUNTRY INDEX

AUSTRALIA

Education Circular (W. Australia)	(Monthly, Australia)
Education Gazette (New South Wales)	(Monthly, Australia)
Education Gazette (S. Australia)	(Monthly, Australia)
Education News	(6 per annum, Australia)
Educational Magazine	(Monthly, Australia)

INDIA

Education Quarterly	(Quarterly, India)
Educational India	(Monthly, India)
Educator	(Quarterly, India)

U.S.A.

Educational Administration and Supervision	(U.S.A.)
Educational and Psychological Measurement	(U.S.A.)

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INVESTIGATING SDI

an account of an investigation of the Selective Dissemination of Information to research workers in electronics which is now being undertaken by the National Electronics Research Council

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Paper presented at the 39th Aslib annual conference, Keele, 30th September 1965

The Need for SDI

From investigations made by the NERC Working Party on Scientific Information it is clear that, even in the restricted field of electronics research, there are already too many different sources of current-awareness information, mainly abstracts journals and title lists, which must be scanned by a research worker who wishes to keep abreast of developments in his field. To ensure that he knows of all the published and semi-published information of interest to him he may have to scan more than ten current-awareness publications each month.

In addition, all the indications are that electronics research is not a unique subject in this respect, and that many other sciences and technologies have the same problem, in a more or less acute form. Under these circumstances it is obvious that some approach is desirable other than issuing a list or lists of general interest to a large number of users, i.e. a selective approach is required to provide only those items likely to be of interest to each individual.

Selective Dissemination of Information

Selective Dissemination of Information (SDI), which has been in operation in the USA for some years, is basically a method of providing, on a large scale, a 'personal' current-awareness information service to individuals or groups.

A number of libraries or information services have been providing for many years a personal service in which each item received is scanned by the library or information service staff with the needs of their users in mind and the item (or a notification of it) sent to those individual users who are likely to find it of interest. Where there is a close relationship with the users and an up-to-date and complete knowledge of their interests, this method is unrivalled for supplying current information to a comparatively small number of users, but for a large-scale service computer methods must be adopted.

In the computer or machine SDI system each user provides details of his subject interests. These concepts are translated into the index terms used in the system, forming a 'user-profile'. These profiles (and details of the user to whom each refers) are stored in a machine file.

As documents (periodical articles, reports, conference papers, etc.) are received by the information service they are indexed by subject, using the same vocabulary of terms, and details of each document and the terms used to index it are transferred to a second machine file.

At suitable intervals the two files, of user-profiles and indexed documents, are compared by the computer. Where there is a sufficiently close matching of terms between a user-profile and a document the details of the document are printed-out and sent to the user.

An important element in the SDI system is the provision for 'feedback'. The user is asked to assess the relevance to his requirements of each item of information he receives in the SDI system. His relevance assessments can then be used either to adjust his profile to meet any change in his interests, or to alter the level of match when he wishes to receive more, or less, information.

The National Electronics Research Council

NERC was established in July 1964 to initiate and encourage the co-ordination of electronics research in industry, universities and colleges, and government research establishments. From its inception, and in fact before its formation, it has been extremely concerned with the information problem and anxious to assist electronics research workers to obtain the information they require.

Although it seemed that SDI would provide at least a partial solution to the current-awareness problem, the Council considered that it would be undesirable to establish an operational system until more was known on the value and economics of the system and its acceptability to the users. The Council realized that the results of such an investigation would be of general interest and not confined to the field of electronics. Only the information material and the terms used in indexing it will be specific to electronics. the design of the system, the techniques used and the computer programmes will be immediately applicable to most other branches of science and technology.

The Council therefore proposed, and has received initial government support for, a project which will consist of first setting up a system to provide an SDI service to some 800 electronics research workers, and then investigating the value and economics of the service.

Organization

The project will be administered by the National Electronics Research Council, under the direction of the Technical Officer, with Mr C. W. Cleverdon as Consultant. The day-to-day supervision of the project will be carried out by the Assistant Director, Mr P. Clague.

The system will be specified and the indexing and assessment carried out by the project staff. The computer facilities will be obtained by tender from a computer service bureau.

Information Material

The information material used in the project will consist of English-language periodical articles, conference papers and technical reports which have significance to the research worker in electronics. It is estimated that the total number of such English-language items is unlikely to exceed 15,000 per year.

It is hoped to cover periodical articles of interest to the electronics research worker as comprehensively as possible, including regularly published cover-to-cover translations of foreign periodicals.

The technical reports included will be mainly those originating in Britain, Commonwealth countries and the United States. NERC is at present encouraging government and industry to make freely available as many electronics reports as possible: all those which become available will be included. Reports issued in Commonwealth countries will, it is hoped, be made available through various arrangements which are at present under discussion.

United States reports will be selected from *US Government Research and Development Reports* and *NASA Scientific and Technical Aerospace Reports (STAR)*.

Indexing Language and Indexing

The Thesaurus of the Engineers' Joint Council (USA) will be used as the basis of the vocabulary of indexing terms for the project. The preliminary work which has already been done in the project has shown that a large number of additional terms will be required. It is hoped to arrange for the new terms found necessary in the SDI project to be generated in conjunction with EJC and Engineering Index, who are using the thesaurus as the basis for their new 'Electrical and Electronics Engineering Section'.

The User Group

It is hoped to obtain the co-operation of some 800 electronics research workers to act as members of the user group for the project. These research workers will be drawn from universities and colleges of advanced technology, industry and government research establishments and it is intended that the group should be as various as possible, ranging from junior engineer to chief engineer and from research student to professor.

An important part of the project will consist of investigating the value of the SDI service to different classes of user and how the value may vary with, for example, the user's subject interest, his degree of specialization and the type of research on which he is engaged.

User-Profiles

If the SDI system is to be successful it is essential that the profile of each user should exactly meet his requirements. Considerable thought has been given to the definition of the user's information requirements, e.g. whether his profile should be based solely on the research project he is working on or on the subject interests of his post, but it is considered that it must be left to each user to decide the range of information he requires.

Some work has already been done, and it is intended to do more before embarking on the compilation of profiles for the main group of users. At present it is expected that each user will be asked to provide details of the subjects or topics on which he is interested in receiving current information, which aspects of these he is particularly concerned with and which aspects he does not wish information on. On the basis of this information a first approximation to his profile will be compiled in the index language. This will be referred to him and after discussion with a member of the project staff amended to give the initial profile which will be used in the experimental phase of the project.

Preliminary experiments are also being conducted on the various methods of matching user-profiles and documents. It may be necessary to adopt different methods as well as different levels of matching for different users, since they vary so greatly in their range of interests and their attitude to information. In the latter must be included their tolerance of 'noise', i.e. the irrelevant material which they will receive in the SDI service, since this will to a large extent determine the acceptable method or level of matching.

Users' Assessment

The details provided to users in the SDI service will consist of: title, author, bibliographic reference of the item, and a listing of the terms used to index the item (i.e. no abstract will be given).

The users will be asked to assess the relevance of the items they receive, either on the basis of the details supplied or from examination of the original document, as convenient. The user will report on the relevance of each item received by punching out the appropriate holes in a pre-scored card, to indicate whether the item is relevant or irrelevant to his interests, whether it has been seen before, and whether the assessment is based on an examination of the original.

The users will also be asked to examine issues of the *Weekly Information Bulletin* at intervals. The *Bulletin* will consist of a complete print-out of the information material received in the system in the previous week. From examination of this a user will be able to state which items of interest to him were missed by the SDI system.

Analyses and Tests

The above assessments by the users will provide a measure of the efficiency of the SDI service in providing the required information and screening irrelevant material. These two aspects will be optimized to each user's requirements and at a later stage his estimate of the value of the service to him will be obtained.

These estimates will be supplemented by obtaining from users a list of those items of information, however obtained, which were found of particular value in recent months and determining which of these were notified to the users by the SDI system.

In addition, as another approach to the assessment of its value, the effect of the system on the information-gathering habits of the users will be studied, on the lines of the Aslib investigation by Martyn. A survey of the users of the system will be made before the SDI system is established and repeated towards the end of the project when they have received the SDI service regularly for at least a year. A control group, consisting of a number of similar research workers who are not participating in the SDI investigation, will be surveyed on each occasion, to evaluate the contribution of any other factors to the changes found.

Other investigations will include an analysis of the value of titles only, abstracts, and lists of descriptors in the assessment of relevance.

The IR efficiency of the indexing will be tested during the preliminary phases, and towards the end of the project this will be repeated on a larger scale to evaluate the efficiency of the system for retrospective searching.

Co-operation with Local Information Services

The Council is very anxious to obtain the co-operation of the librarians and information officers of the organizations to which the participants in the SDI investigation belong. It is hoped that the local librarian or information officer will be willing to assist in the gathering of the user groups and in obtaining the details on which the user-profiles will be based. In the course of the project he might act as an intermediary in distributing the SDI notifications sent in bulk, thus having advance warning of the demands likely to be made on his service. He might also be able to supplement the regular feedback by collecting the users' informal impressions of the SDI service.

While much of the SDI investigation must be carried out centrally, there is much which can best be done locally. In particular, the local librarian or information worker might carry out research into the changes in the use of his service by those participating in the SDI investigation: whether there is a change in the number of periodicals they require on regular circulation, in the titles of the periodicals, in the time they spend browsing in the library, or in the number of retrospective searches they require.

The whole project will depend to a very great deal on the goodwill of many local librarians and information officers. It is most encouraging that a number have already given assistance in providing the names of possible participants and many others have offered their co-operation when it is required.

Programme

The three-year programme is shown on page 349.

It will be seen that the first twelve months of the project will be devoted to preparatory work: the compilation and test of the indexing language; the design, specification, tendering and programming of the system; the gathering of the user group and the compilation of profiles.

The next six months will be an experimental period during which the computer programme will be tested and the profiles and levels of matching will be adjusted.

This eighteen months of preparatory and experimental work will be followed by a twelve months period of running the system on a regular, operational basis, during which the main relevance and other assessments will be made.

The final six months of the three years will be devoted to the completion of all tests and surveys, the analysis of results, and the compilation of the final report on the project.

Present Position and Progress to Date

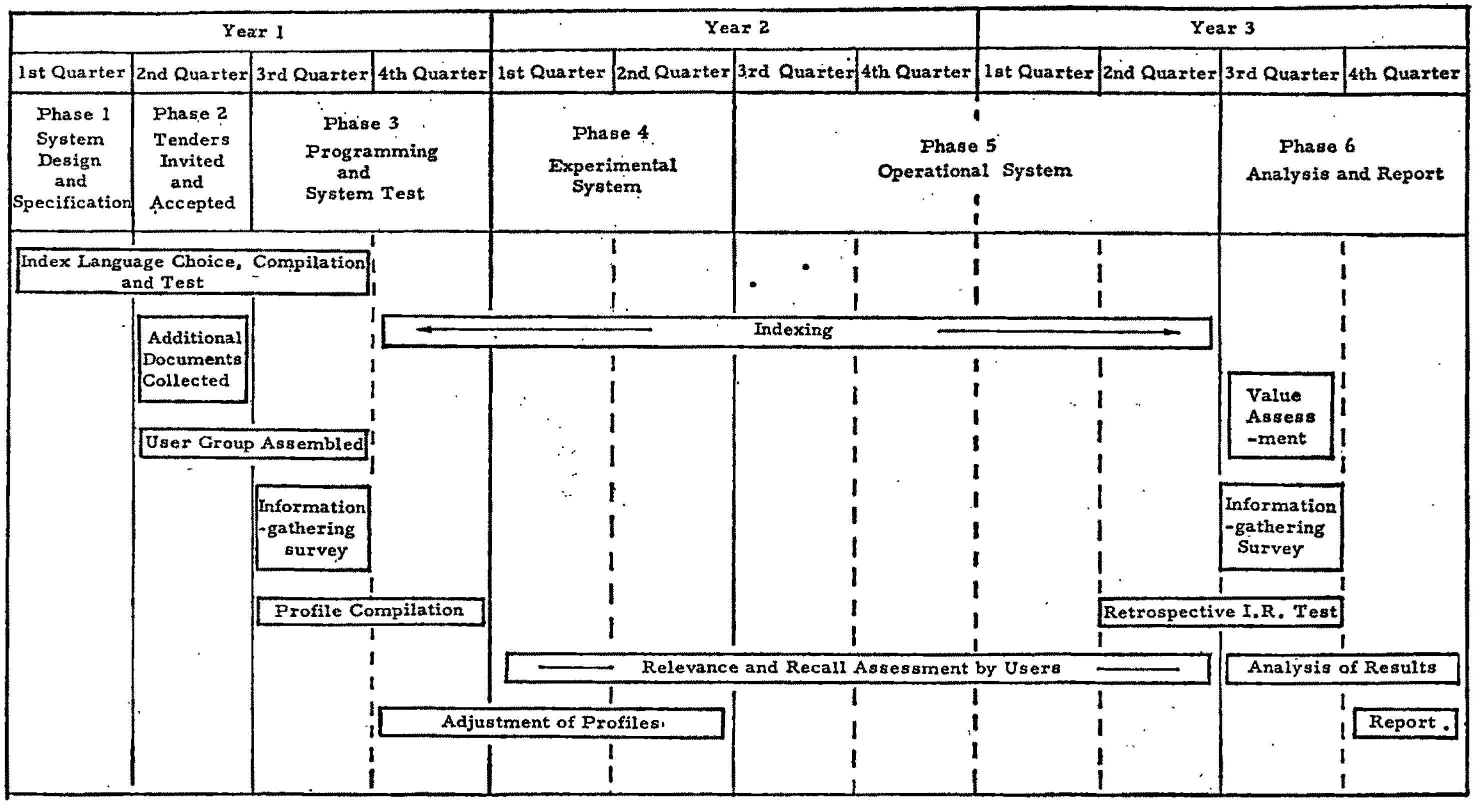
The Office for Scientific and Technical Information of the Department of Education and Science has awarded a grant of £6,000 in support of the preliminary design study stage of the project (i.e. Phase 1 and part of Phase 2), which will start in October 1965. During the five months period the design requirements of the system will be established and a specification issued on which computer service bureaux will be asked to tender for the design of the system, the programming and the regular provision of computer facilities. At the end of the period NERC will be in a position to formulate detailed proposals for the later stages of the project.

Although the project will not start until October, a considerable amount of preliminary work has already been carried out. The EJC Thesaurus has been examined for its practicability in the indexing of material on electronics research. One approach to this was the construction of a detailed classification of radar which showed which terms were not included in the present Thesaurus. The classification will also be of value in compiling user-profiles and in indexing.

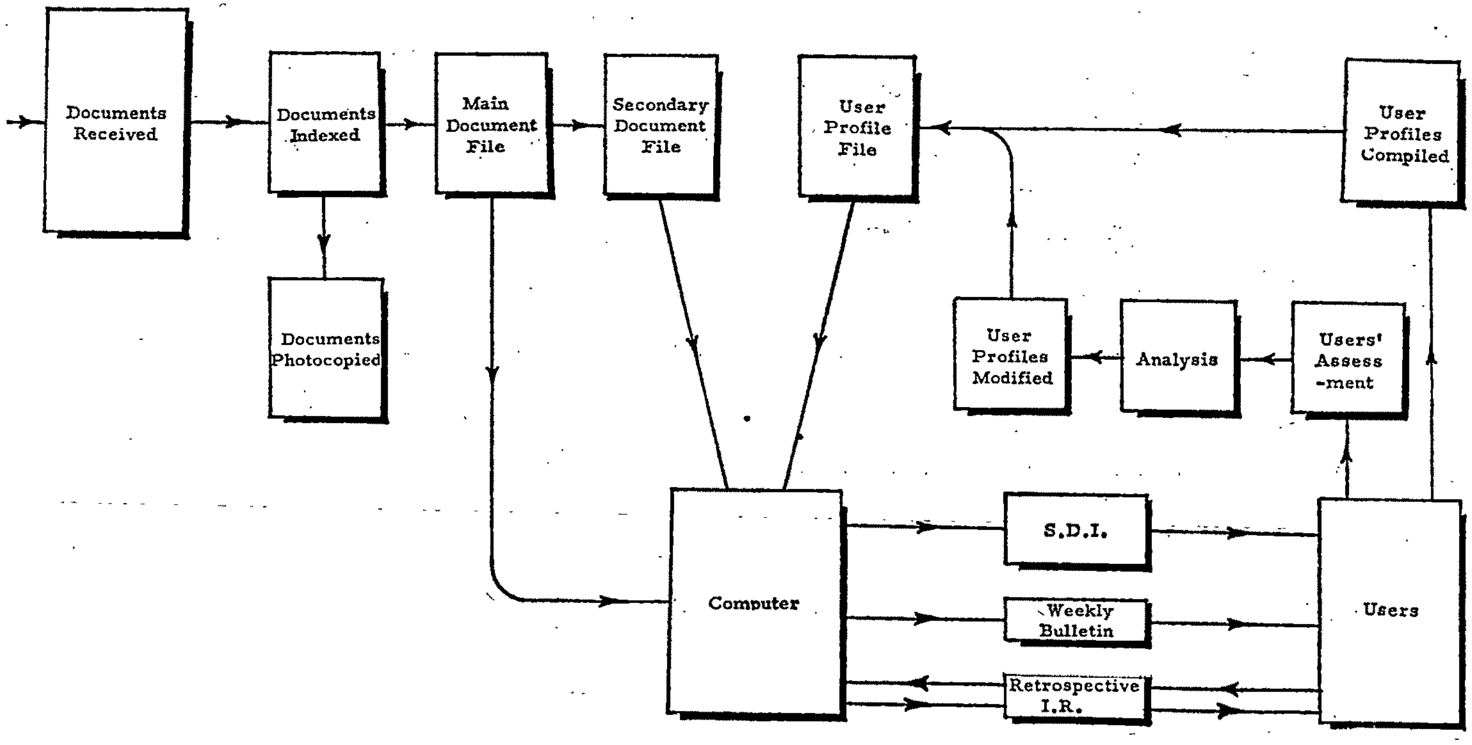
A sample corpus of 200 periodical articles has been indexed using the EJC Thesaurus. These will be used to give an approximate assessment of the IR efficiency of the indexing.

With the co-operation of British Aircraft Corporation (Operating) Limited, Stevenage, sixteen profiles on a range of electronics research topics have been compiled. These are being used, with the 200 indexed documents, to test possible methods of matching. It is hoped that the results of this preliminary work will assist in the design of a larger and more rigorous investigation which will be carried out in the first phase of the project.

PROGRAMME


Year 1
Year 2
Year 3
1st Quarter
2nd Quarter
3rd Quarter
4th Quarter
1st Quarter
2nd Quarter
3rd Quarter
4th Quarter
1st Quarter
2nd Quarter
3rd Quarter
4th Quarter
Phase 1 System Design and Specification
Phase 2 Tenders Invited and Accepted
Phase 3 Programming and System Test
Phase 4 Experimental System
Phase 5 Operational System
Phase 6 Analysis and Report
Index Language Choice, Compilation and Test
Additional Documents Collected
User Group Assembled
Information -gathering survey
Profile Compilation
Indexing
Relevance and Recall Assessment by Users
Adjustment of Profiles
Value Assess -ment
Information -gathering Survey
Retrospective I.R. Test
Analysis of Results
Report

FLOW DIAGRAM



DISCUSSION

(*on papers by Dr H. Coblans,* D. J. Foskett and T. M. Aitchison*)

Questions put to Mr Aitchison during the evening dealt mainly with the method of his SDI investigation. In reply to Mr C. S. Sabel (Central Electricity Generating Board) Mr Aitchison said that progressive modification of user profiles would be attempted. In answer to a point made by Mr D. V. Arnold (ICI Heavy Organic Chemicals Division) he affirmed his belief that co-operation with librarians was essential. Mr P. E. Colinese (Central Electricity Generating Board) asked about the method of assessment of relevance by users. Mr Aitchison indicated that this would become more stringent as the study progressed. In reply to Mr D. H. Barlow (McGraw Hill) he said that three indexers would be required for indexing a maximum of 15,000 documents a year. To questions on the amount of computer time required and the percentage of key word match which would enable him to regard a document as relevant to a user, he replied that they hoped to have answers within the next four months. Mr C. S. Sabel (Central Electricity Generating Board) wondered what was the best way for work on mechanization to be co-ordinated. Mr Aitchison thought that since so few people were working in this field there was little risk of fruitless duplication of effort.

Much of the other discussion was concerned with the capabilities of computers, the relative desirability of general and special purpose machines, and the shortcomings of KWIC indexes.

Mr P. F. Cole (British Petroleum) thought Dr Coblans had been unduly pessimistic about the possibilities of computers.

Dr Coblans replied that he had been concerned to redress the balance against those who had been too uncritically enthusiastic.

Mr P. R. P. Claridge (Warren Spring Laboratory) asked about the use of character recognition devices.

Dr Coblans thought this a possibility for the future, but doubted whether it would be practicable within the next five to ten years.

Mr J. E. L. Farradane (Northampton College of Advanced Technology) pointed out that even if an optical reading machine were developed, it would not understand what it read. Present mechanized systems were performing 'housekeeping' tasks only. Mechanizing true information retrieval would involve processes of great complexity for which mere data-processing machines were ill-adapted. It would be easier in pure science than in technology, owing to the latter's peculiarities of language and jargon.

Mr P. R. P. Claridge (Warren Spring Laboratory) said that he was concerned with the problems and cost of actually putting the information into the machine.

Mr A. J. Mayne (self-employed) emphasized the desirability of recording documents in machine-readable form at the time of publication, and also stressed the inadequacy of present-day digital computers for information retrieval. New techniques were required, and he suggested that the photochromic micro-image (PCMI) devices developed by the National Cash Register Company in the USA were a significant advance.

Mr J. D. Black (IBM UK Laboratories Ltd) said that the size of the market did not warrant the development of expensive special-purpose equipment which would differ little from existing general-purpose machines.

The chairman, Dr W. E. Batten, said that the 200 : 1 image-reduction possible with PCMI devices required very sophisticated techniques, at present confined to the laboratory.

Mr P. E. Colinese (Central Electricity Generating Board), commenting on Dr Coblans' remarks on the relative costs of machine and manual methods, suggested that demands on a service might necessitate the use of mechanized techniques in spite of higher cost.

Dr Coblans agreed that cost was not the only determinant. Mr H. East (Aslib Research Department) remarked that large firms nowadays were talking of cost in terms of 'graduate-hours'.

Mr J. S. Rippon (Metal Box Co. Ltd) complained of the poor quality of machine-produced indexes, and of KWIC indexes in particular. He considered some degree of classification essential to high-quality searching, and wondered to what extent this could be achieved economically by machines.

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* Dr Coblans' paper on the use of mechanization in information will not be published in *Aslib Proceedings*. A fuller version of it will shortly appear as a separate report.

Mr J. R. Sharp (ICI Fibres Ltd) found it disturbing that the manner of talking about machines had not developed in the last fifteen years. He was confident that computers could be made to do whatever was required. Special-purpose machines could then be built to do what the computers had been made to do. The reason for the greater success so far with 'housekeeping' than with retrieval was that the former was better understood.

Mr J. D. Black (IBM UK Laboratories Ltd) suggested that Mr Foskett's examples of bad KWIC indexing illustrated the ill-disciplined state of the social sciences. Care had to be exercised in the preparation of material for input to KWIC programmes. For documents within a narrow subject field, these could give good results relative to cost. The computer was neutral: its virtues and limitations were those of the people who defined and analysed the problems that were presented to it. Increases in storage capacity and processing speed, and new programming techniques were increasing the usefulness of computer systems for information retrieval.

Mr A. Styles (International Computers and Tabulators) said that the basic KWIC index could be refined by using selected words only, or by annotating the titles. The chairman pointed out that pre-editing of titles would lose the advantage of KWIC by introducing intellectual effort. Mr Styles said that the return from such a system was proportional to the intellectual effort put into it.

Mr V. Biske (Lobitos Oilfields) suggested that editors should exercise a stricter control over authors' choice of titles.

Mr Foskett felt this to be an unwarranted interference with Authority's freedom, and maintained that in the social sciences a title could well be significant and yet not contain any key words that would be used as search terms. He held that his main criticisms, on the debasing of good indexing standards, had not been answered at all.

Mr P. F. Cole (British Petroleum) acknowledged the low standard of some KWIC indexes, but suggested that there was often resistance to the idea of sorting anything on its title alone. He referred to American researches which had tended to show that abstracts were only slightly more valuable (in the making of relevance judgments) than were titles alone. He suggested to Mr Foskett that titles of serious works should be appropriate.

Mr A. J. Mayne (self-employed) suggested that, for information-retrieval purposes, documents should have a meaningful subsidiary title. He himself found abstracts essential.

Mr J. E. L. Farradane (Northampton College of Advanced Technology) pointed out that a KWIC index was usable without great intellectual effort only if the keyword in the user's mind was the same as that which everybody else had used.

Mr J. D. Black (IBM UK Laboratories Ltd) gave, in response to a question from Dr Campbell (Pressed Steel Co. Ltd), a short account of non-sequential storage methods. Mr H. East (Aslib Research Department) suggested that the method of storage was unimportant so long as retrieval time was acceptable.

Mr J. E. L. Farradane (Northampton College of Advanced Technology) said that the use of random-access devices was expensive at present.

Mr A. H. Holloway (Naval Scientific and Technical Information Centre) pointed out that what could be got out of any indexing system was equal only to what was put in. Provided the right instructions were given, everything which was put in could also be got out.

Summary by A.W.

NOTE:—Although we shall not be publishing Dr H. Coblans' paper on 'The use of mechanized methods in information' in *Aslib Proceedings* (a fuller version of it is to appear as a separate report) some points which arose during the discussion which immediately followed the paper may nevertheless be of interest to readers. These are as follows:

In reply to questions on the availability of abstracts in machine-readable form, Dr Coblans indicated that, although some services were issuing indexes on magnetic tape, the computer storage of abstracts was not being undertaken. The chief problem was the amount of text which had to be handled if abstracts were to be put on tape. At Euratom the feeding of abstracts into the computer was considered to be definitely uneconomical. A solution which many people would no doubt recommend was the use of mechanical indexing techniques.

Mr R. Sewell (United Steel Companies Ltd) considered it dangerous to assume that the need of mechanization was greater in technology and industry than in pure science. Just as much intellectual effort was required in the former, where co-ordinate indexing and thesauri were in use, as in the latter.

In reply, Dr Coblans referred to Cahn's* survey of chemical literature, which pointed out that the meaning of expressions was least clear-cut in the theoretical aspects of chemistry. The more theoretical a subject was, the more difficult it was to put its vocabulary into machine form, although the use of less theoretical vocabularies required no less intelligence.

Mr A.H.Holloway (Naval Scientific and Technical Information Centre) suggested that the large proportion of inquiries at the Library of Congress for specific titles or authors might be due to users' belief that this type of inquiry stood the best chance of getting a readily useable result.

Dr Coblans replied that Dubester's survey† had tried to allow for this. However, the Library of Congress was much concerned with the social sciences, in which importance was often attached to obtaining the work of particular authors.

Summary by A.W.

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